1-15 FEBRUARY, 2022

Down To Earth

FORTNIGHTLY ON POLITICS OF DEVELOPMENT, ENVIRONMENT AND HEALTH

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# PARTIAL COVERAGE

Climate change hits farmers the most, but adaptation mechanisms like crop insurance not helping much

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VISIT…

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# Our broken system of clearance

RANKING IS an instrument to reward the best performers—but more importantly, it signals the best way to do things. So, when the Union Ministry of Environment, Forest and Climate Change (MoEFCC) says that it will rank the state environmental impact assessment authorities based on the speed at which environmental approvals are given, it basically implies that all it cares about is the "clearance" of projects, not the quality of the assessment or the ability to ensure that the environmental impacts of development projects are mitigated. You could argue that time taken is not an indicator of the level of scrutiny—and that MoEFCC's notice is designed only to hold the assessment committees accountable and to ensure that projects are not unnecessarily delayed. But it is not that simple. The fact is this "ranking" is the final nail in the already built coffin of environmental assessments.

Over the past decade or so, government after government has systematically decimated the process of decision-making that would allow for assessment or scrutiny. It is a sham and a farce, and in my view this direction by the ministry—set up to purportedly safeguard environmental interests—has only made its contempt for its self-built process apparent.

**Environmental impact assessment has become a convoluted exercise, designed for futility**

Environmental Impact Assessment (EIA) started way back in 1994, when development projects were few and the process remained uncontested. The rot took hold from the early 2000s when "building" projects were included in this system of scrutiny. There is no question that construction, especially large-scale housing, infrastructure or commercial projects, have a massive environmental footprint. They add to water usage, wastewater generation, traffic, and to solid waste. The problem was the system was never upgraded to handle the huge volume of "building" projects. This led to delays and high transaction costs—corruption, in other words. So in 2006, MoEFCC decentralised, and outsourced the work to states. It replicated the Central system at the state level, setting up the state environmental impact assessment authorities. A maze of categories—projects falling into A, B, BI and B2—were created, with overlaps and a good measure of discretion thrown in. All in all the quality of scrutiny has not improved and development projects are not more environmentally compliant. EIA has become a convoluted exercise, designed for futility.

Why do I say this? Just consider how fundamentally flawed the process is today. The project proponent is expected to pay consultants to do the EIA, which is based on the terms of reference (ToR) approved by the Central or state environmental impact assessment authority. Category A projects come to the Centre and B go to the state, where the state authority then decides if it is B1 (projects requiring detailed assessments) or B2 (that do not require detailed assessments). The committee can approve the ToR, ask for more information or reject it. After this, the EIA is done which, in turn, requires the involvement of at least 12 functional area experts and management and monitoring plans. The draft EIA is in English and its summary in the regional language, which is then put out for public consultation. A detailed process is in place for holding the public hearing, which would be crucial for "listening" to local objections. Then all this goes to appraisal committee, which has to scrutinise the draft, ask for more information, and accept it with conditions or reject it.

In actual fact, projects are rarely "rejected". In our analysis of projects between July 2015 and August 2020, of the 3,100 projects submitted, only 3 per cent were *not* recommended. Even these would come back with more information.

In this way, proponents are asked—and more so in controversial projects—many times to come back with more data and more clarifications. Finally, the committees "clear" the project, and in most cases, to protect themselves they do so with a fistful of conditions that will never really be monitored. The faceless committees are not held responsible for the project post clearance; their "job" ends with this clearance. So you really cannot hold them responsible for the quality of the decision taken. The monitoring is then left to the understaffed regional offices of MoEFCC—state pollution control boards are not empowered to monitor impacts as this clearance is done under the Environmental Protection Act and not under the laws governing air or water. In all this, there is duplication, lack of scrutiny and no real intent to ensure that projects are implemented keeping in mind environmental interests.

So, when we defend this broken system of "clearances" it only adds fuel to the fire of the extremely false narrative of environment versus development. In reality, environmental interests have already been given a bypass and development has become mindless, without any regard for what can be done to mitigate and manage harm.

I will discuss, next time, what needs to be done if we are serious about improving decision-making for sustainable development. DTE @sunitanar

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DownToEarth
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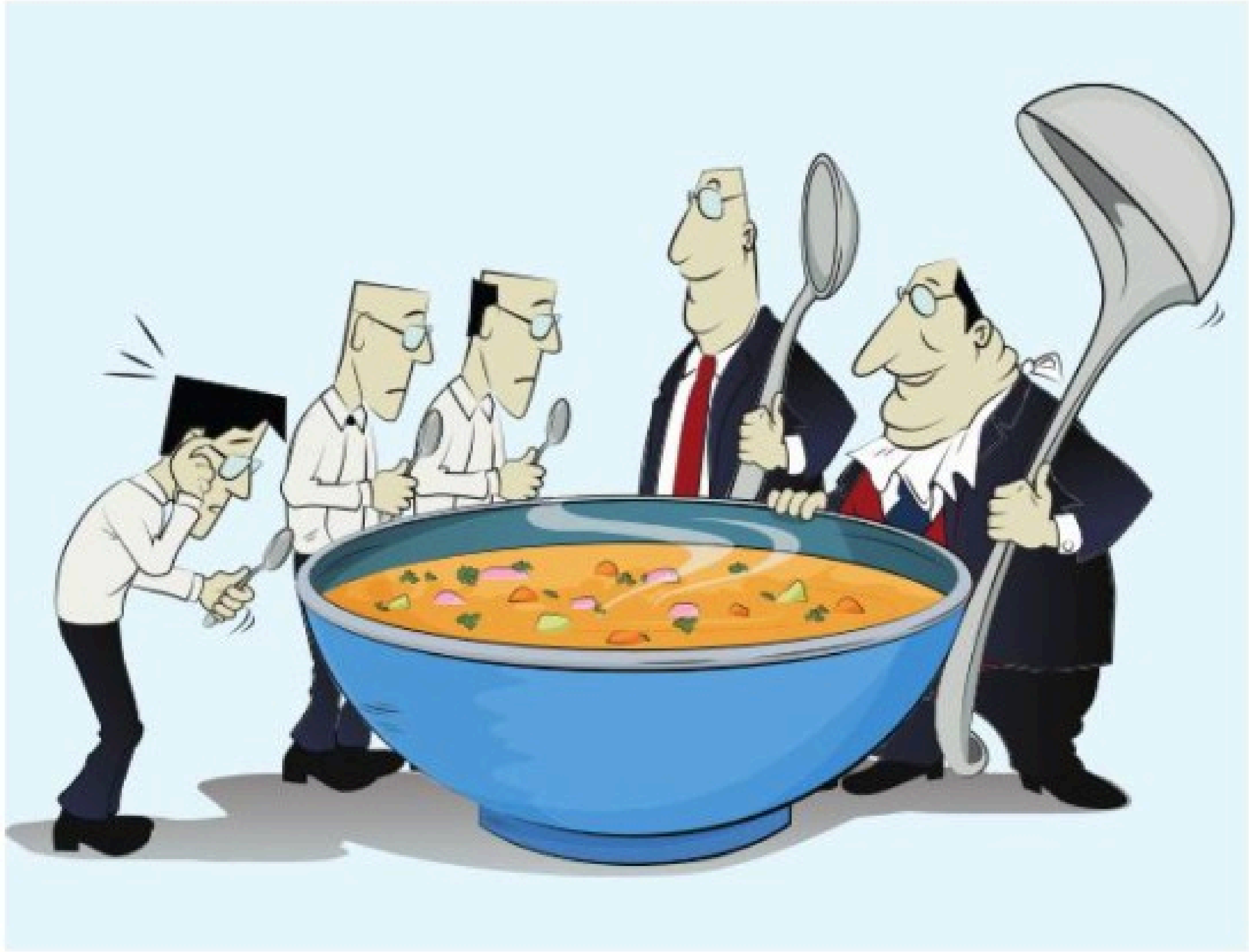
# Engage



## The growing divide

The incisive article, "Some more unequal" (16-31 December 2021) reminded me of Dutch economist Jan Pen. In 1971 he came up with a graphical representation of income inequality within the British economy by imagining the heights of all adults as proportionate to their incomes. Pen said that a parade wherein the adults marched in the ascending order of their income would look like a sea of dwarves with some giants at the tail-end. The first rows, of owners of loss-making businesses, the unemployed and the working poor, will not be visible at all; their heads would be below the ground. It would take about 45 minutes before the marchers appear of average height. The final row, the highest earners, would be around 3,200 m tall.

Pen's parade example is applicable in every economy, and can also be useful in showing the income and wealth inequality as shown in the "World Inequality Report 2022".

In their book titled *The Spirit Level: We Equal Societies Almost Always Do Better,* Kate Pickett and Richard Wilkinson demonstrate that countries with higher levels of income inequality experience more health and social problems compared to more equal countries. Inequality has damaged our ability to live on this planet and succeed in the fight against climate change. The growing threats of extremism and terrorism have exacerbated economic deprivation and inequality in access to resources. These factors further promote a divisive agenda of sectarianism, xenophobia and nationalism.

**JAYDEV JANA**
**KOLKATA**

## Only on paper

This is with reference to the article "Rooftop solar: Why India is now considered to be a laggard globally", published online on January 12, 2022. No government will fully support solar rooftop schemes as it will free people of bills. This is similar to the Centre's Har Ghar Jal Yojna; instead of improving our degrading *nullahs*, authorities have installed in our homes taps that provide water from distant sources. Some schemes are just implemented to show groundwork, without any regard to what is going wrong.

**MANISH**
**VIA EMAIL**

## No lions in Africa

This is in reference to "Barbary lion reintroduction in north Africa is possible but needs long-term plans", published online on August 21, 2020. I hail from the Atlas Mountains of Morocco, and the last time a lion was spotted in the wild here was in 1979. It was killed after attacking livestock. This happened in Taza, Maghraoua and Tlajdout regions.

**MOHAMED**
**VIA EMAIL**

## Capture potential

This is with reference to the article "How technology can help in capturing carbon", published online on October 30, 2019. Great content! Direct air capture allows us to capture carbon dioxide from the air and turn it into products or fuel, or store it underground. No other option has the potential to remove carbon. We need more financial support to scale this up.

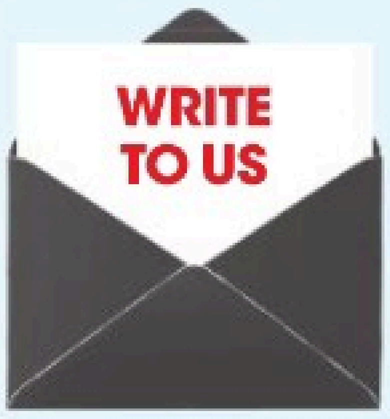
**SREE**
**VIA EMAIL**

PHOTOGRAPHS: MULTIPLE SOURCES

## Population explosion

I read every edition of *Down To Earth* that comes to my house twice a month. It has a long tradition of highlighting problems related to the general public. The last edition of the year ("2021: Here to stay", 16-31 December 2021) is an example of this; it speaks of climate change, floods, healthcare among other things. But in my opinion, the root of all these miseries is the growth in population. Global population stood at 2 billion at the start of the 20th century. Now, 100 years later, it has reached at an alarming 7 billion. We as people and as nations ought to recognise the consequences of this. Just as we struggle to curb greenhouse gases, we also need to control the population growth. All developing nations such as India and China should fix targets for this just the way Russia, Japan, Germany and Italy have done.

**KIRAN SHARMA**
**SUNDER NAGAR**



*Down To Earth* welcomes comments and suggestions from readers in response to its articles and opinion pieces. We are introducing a "Pick of the Postbag" award, under which the letter adjudged the best will be highlighted and the winner will receive a free one-year digital subscription of the magazine. Letters may be e-mailed to *editor@downtoearth.org.in* or sent to: The Society for Environmental Communications; 41, Tughlakabad Institutional Area; New Delhi-110 062. Letter writers should mention their full name, postal address and phone number.

**DTE TV**

### Never-ending list of COVID-19 variants

Even as the world strives to tackle and mitigate the effects of Omicron, reports of new coronavirus vairants IHU and Deltacron appeared in France and Cyprus, respectively, in the first week of January. The latter has invoked more concern as reports suggest Deltacron has a similar genetic background to the Delta variant along with some of the mutations from Omicron. Even as experts say that it is not something to be worried about at the moment, they are divided on the reason behind its emergence. Watch to learn more about their views.

FOR MORE VIDEOS, SCAN

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# Digest

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Smart solutions to reduce human-wildlife conflicts **P10**

Climate tipping points could be closer than we think **P11**

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**1,000 WORDS** VIKAS CHOUDHARY

Medical professionals oversee preparations at a COVID-19 Care Centre set up in the Commonwealth Games Village in Delhi. With a surge in COVID-19 infections, reportedly caused by the Omicron variant of the novel coronavirus, the national capital has set up more than 4,200 beds across eight care centres to accommodate patients requiring urgent attention. As of January 18, only 13 per cent of the beds were occupied by patients with mild symptoms. Nevertheless, healthcare experts warn that the fewer hospitalisations do not necessarily indicate that the infection has become less dangerous.

FOR MORE PHOTOS, SCAN

# Good riddance

A firm develops safer devices that use light and sound to reduce human-wildlife conflicts

**DAKSHIANI PALICHA**

**FOR YEARS,** Malan Raut and her family would take turns to stay up at night and watch over their field. Despite working all day, sowing and harvesting vegetables on their 0.8 hectare (ha) land, the night shift was necessary to keep wild animals away. "Deer, wild boar, nilgai and rabbits would eat half of the crops at night, and we would incur huge losses," says Raut from Nagarsoga village in Latur district of Maharashtra.

Like several farmers across the country who suffer from crop loss because of wild animals such as deer, monkeys, elephants and even tigers and leopards that raid farms in search of food, Raut put up an electric fence to keep the nocturnal thieves away. But it proved ineffective. Then, in June last year, Pune-based non-profit Swayam Shikshan Prayog that works with women farmers told her of a smart device: Parabraksh, a solar-powered smart animal deterrent light. Its name is a Hindi portmanteau that means protection from wild cats. The non-profit gave her the device for free as a pilot test.

"The device mounted by four bright LEDs automatically switches on at night to repel animals. The range of the light can vary depending on the requirement," says S R Ayan, founder and director of the Bengaluru-based company Katidhan Tech Private Limited, which has designed and manufactured the smart light. Raut has installed the light to cover 0.2 ha and it already shows good results. "There is now 75 per cent less damage in that area," she estimates.

Parabraksh, priced at ₹10,000, is one of two unique animal deterrent solutions offered by Katidhan Tech. The other device Kapikaat, a Kannada portmanteau that translates to monkey trap, is a two-speaker sound system that mimics voices of predators to repel monkeys. "They are an acute menace in places like Bengaluru. Kapikaat, priced at ₹10,000-15,000, if placed in high spots such as trees, can detect their movement through sensors and play sounds of tigers or lions to scare them off," says Ayan.

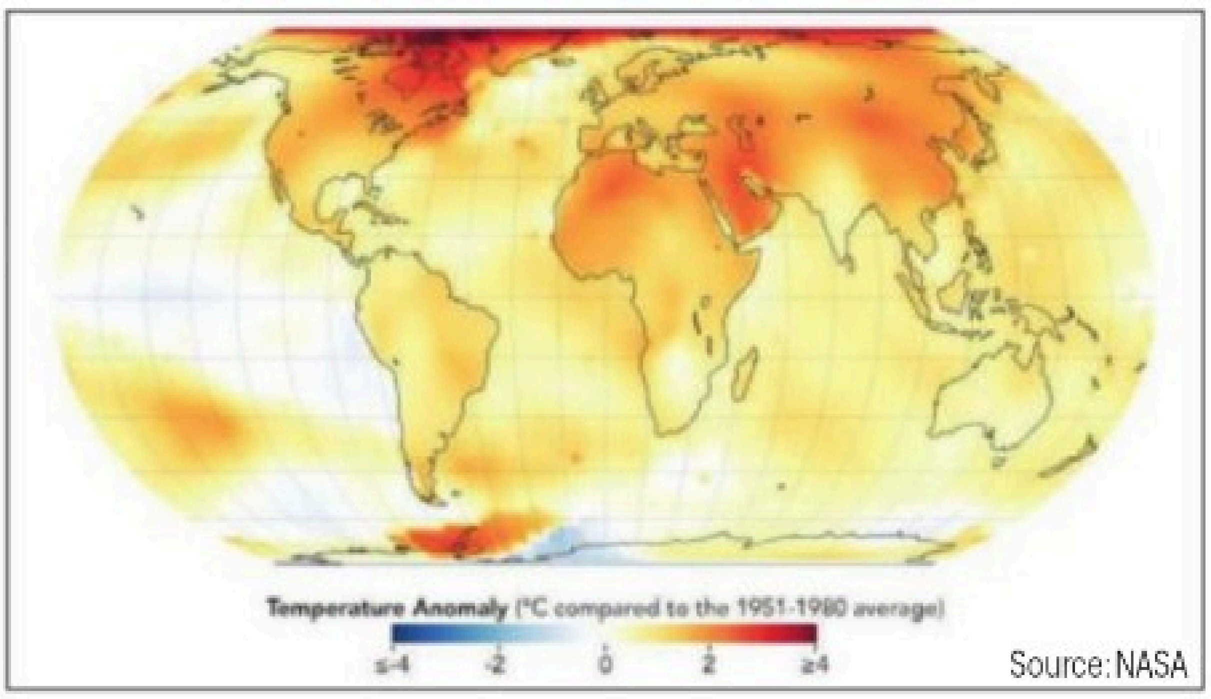
The idea of Katidhan first took shape in 2017, after Ayan quit his job at an engineering solutions firm and started working on service-based solutions with a few peers from the industry. "I once heard about snow leopards destroying farms in Ladakh. Since electric fences are a cruel solution to such human-wildlife conflicts, we wanted to come up with a safer option," he says.

His team took two years to develop and refine the two devices. "We made them solar powered so they could be used in areas without access to electricity. We have also fitted them with a micro USB so they can be charged with power banks or phone chargers, in case solar energy proves inadequate," says Ayan. Since 2020, the company has deployed the solutions in 11 states. Apart from farms, industrial units and factories have also installed the devices to tackle wild animals, claims Ayan.

"We are now looking at ways to improve the effectiveness of the devices. Kapikaat plays different sounds each time so that monkeys, which are highly adaptable, do not get used to the speakers," he adds. Similarly, they also need to adapt to different animals as they do not display the same behaviour everywhere. For instance, Ayan explains, elephants in northern and southern states may exhibit more or less the same behaviour, but the various monkey species behave differently. The company hopes to build more simple solutions for such complex problems.

**CLIMATE CHANGE**

# 2021 was Earth's sixth-hottest year



Source: NASA

**THE YEAR** 2021 was the fifth warmest for India since 1901. The "Climate of India during 2021" report published by the India Meteorological Department (IMD) on January 15 says annual mean temperature of the country was 0.44°C above the long period average (LPA). Further, IMD says 11 of the 15 warmest years on record in the country occurred in the last 15 years (2007-2011), with 2016 being the warmest. The year has seen an annual mean temperature of 0.78°C above LPA.

In terms of rainfall, the country saw rains 105 per cent above the LPA for 1961-2010. More than 20 states saw extremely wet to severely wet conditions while most of the northeast India saw severe to extreme dry weather conditions.

Moreover, the report says extreme weather events such as cyclonic storms, landslides and floods claimed 1,750 lives during the year. Maharashtra saw most casualties at 350.

IMD's findings on the rising temperature are in line with the reports from global agencies that say the world as a whole saw warmer-than-usual weather in 2021. Separate analyses by US space agency NASA, US National Oceanic and Atmospheric Administration (NOAA) and non-profit research organisation Berkeley Earth in California say 2021 was the sixth warmest year for the world since 1880, with temperatures reaching 0.85°C above the average for NASA's baseline period.

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**PANDEMIC**

# Uncertain recovery for labour markets

**THE COVID-19** pandemic has made global employment recovery nearly impossible until 2023. In its flagship report titled "World Employment and Social Outlook: Trends 2022" released on January 17, the International Labour Organization (ILO) estimates 207 million people worldwide may be unemployed in 2022, up by 21 million from 2019. Total hours worked may be 2 per cent lower than the pre-pandemic level or equivalent to 52 million jobs lost. The report says during initial recovery, employment trends in lower- and middle-income countries like India remained significantly less due to lower vaccination rates and fiscal space. Variants have further clouded the road ahead. "There can be no real recovery from this pandemic without a broad-based labour market recovery. And to be sustainable, this recovery must be based on the principles of decent work—including health and safety, equity, social protection and social dialogue," says ILO Director-General, Guy Ryder.

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**SPACE**

# James Webb telescope hits major milestone

**THE WORLD'S** largest space observatory, the James Webb telescope, made major strides in its mission on January 8 when it finished deploying the last of its 18 mirror segments into place. The telescope, a joint undertaking of US space agency NASA, the European Space Agency and the Canadian Space Agency, will now take several months to align its mirrors into position to view at least 70 exoplanets in distant solar systems and gather data on their composition and scope for habitability. The James Webb telescope is built to last for 20 years, however, NASA scientists are concerned that it may suffer some damage from space debris such as micro-asteroids. While they remain optimistic on the potential impact of such incidents, the scientists acknowledge that any necessary repair missions may be difficult to plan as the final stop the telescope is scheduled to reach on January 23 is some 1.5 million km from Earth.

COVERAGE

# Davos: Cooperation is key

With 2021 marked by severe impacts of climate change and the pandemic, the world entered 2022 with great uncertainty. To take stock of what can and should be expected, World Economic Forum (WEF) held *The Davos Agenda 2022: State of the World* on January 17-21. Some highlights of the virtual meet:

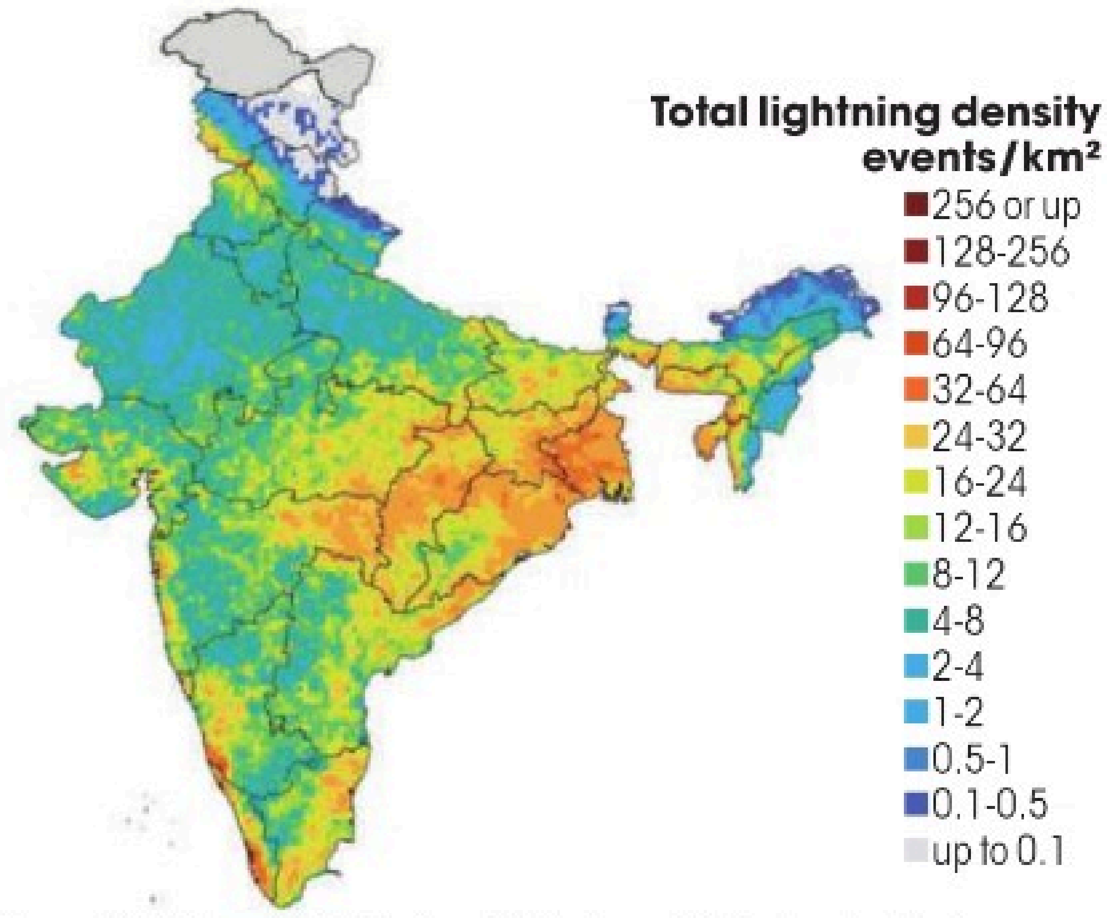
**GLOBAL COLLABORATION** featured in all topics of discussion, from pandemic recovery and climate action to global trade chains. Global public-private effort toward environmental, social and governance metrics was highlighted, along with a shift from shareholder capitalism to more sustainable and inclusive growth in global trade chains.

**CLIMATE ACTION** was on the agenda of most nations. Prime Minister Narendra Modi announced rollout of a "P3" or "pro-planet people" approach to help India meet its climate goals. Latin American nations with key mineral reserves called for greater support to help reduce use of fossil fuels. While leaders from Africa and the UN demanded greater climate financing, new German Chancellor Olaf Scholz promised to muster greater action from industrial nations. Innovation in technology, particularly space technology, to help combat climate change was discussed.

**COVID-19 RECOVERY** discussions were on immediate action on inequalities in access to health and financial resources. While the World Health Organization emphasised on vaccination, especially for African nations, leaders from China, Australia and the EU announced decisive moves to regain the progress on poverty reduction, low incomes and global economic drop lost during the pandemic years.

TRACKER

India saw **51,501,500 lightning strikes** in 2021, the seventh most in the world. On an average, the country sees **16.4 lightning events** per sq km each year.



Source: "2021 Annual lightning Report", Vaisala, a global technology leader and expert in weather, environmental and industrial measurements in Finland

QUERY

# Gates of Hell to be shut

1 **What are the Gates of Hell?** Darvaza gas crater, dubbed Gates of Hell, is a 69 m-wide and 30 m-deep sinkhole in Turkmenistan's Karakum desert. It reportedly formed in 1971 after a failed Russian drilling expedition. Geologists set it on fire to curb natural gas leaking from the crater, but it continues to burn even after 50 years.

2 **What impact have the flames had?** Prolonged burning of the crater has caused more craters to appear in the desert, spewing natural gas into the atmosphere. "We are losing valuable natural resources for which we could get significant profits," said president Gurbanguly Berdymukhamedov recently, calling for the flames to be extinguished.

3 **Can it be closed?** Scientists have made several attempts to do so over the years, without success. It remains to be seen what plan is set this time.

## BITS INDIA

**The Sundarbans** of West Bengal, parts of Odisha and Tamil Nadu are the most vulnerable to storm surges induced by cyclones, according to the country's first weather hazard atlas. The "Climate Hazards and Vulnerability Atlas of India" released by the Union Ministry of Earth Sciences on January 18, lists the potential effects of 13 most damaging meteorological events across the districts. It aims to aid in disaster preparedness as extreme weather events rise in the wake of the climate crisis.

**A protest** in Odisha's Jagatsinghpur district turned violent on January 14 when the police reportedly baton-charged farmers of Dhinkia village for opposing the construction of a steel plant in the region. The farmers are against the acquisition of the village's betel vineyards for the proposed plant, which they say goes against their rights as owners of the vineyards and the surrounding land of the region.

**A 16-year-old** tigress died on January 15 at the Pench Tiger Reserve in Chhindwara district, Madhya Pradesh. Officially named T15 or *Collarwali*, the tigress was referred to as a "super mom" by the staff as she gave birth to 29 cubs in 11 years, of which 25 have survived. They cite the cause of death to be multi-organ failure due to old age.

**Health officials** in Karnataka's Belagavi district have launched a probe into the deaths of three infants on January 16 following a routine vaccination against measles and rubella at an *anganwadi* centre in Salahalli village. The infants, aged 13-16 months, were from a group of 21 children that got vaccinated and began vomiting within hours. Another child, who also experienced similar symptoms, has recovered.

## POLICY FRAMEWORKS

- The Union Ministry of Environment, Forests and Climate Change presented a **draft regulation on extended producer responsibility for waste tyres** that will be effective from the new financial year. The regulations pertain to proper disposal and recycling of scrapped vehicle tyres in the country.

- The Food Safety and Standards Authority of India issued the **Draft Food Safety and Standards (Food Products Standards and Food Additives) Amendment Regulations, 2021**, to specify the use of enzymes derived from genetically modified microorganisms in food processing.

- The Karnataka government has published the draft of the **Active Mobility Bill, 2021**, mandating urban local bodies to design and build infrastructure for pedestrians and fix penalties for failure. The bill envisages equitable space on roads and streets, while striving to create a safe environment for walking and cycling.

## IN COURT

### NATIONAL GREEN TRIBUNAL

- In a case about felling of trees and filling up of water bodies to construct the Meerut-Prayagraj Highway in Uttar Pradesh, the National Green Tribunal (NGT) directed district magistrates to ensure that the project complies with environmental norms.

- NGT asked the Central Pollution Control Board to monitor and regulate operation of jaggery-making units that come up in Madhya Pradesh between November and February. The case was regarding illegal operation of such units resulting in air pollution.

- NGT directed current and incoming chief secretaries of Rajasthan to take remedial action against discharge of untreated sewage and industrial effluents on farmlands of Nokha village in Bikaner district. The tribunal noted that despite repeated orders, the state government has failed to take action citing a lack of funds.

### SUPREME COURT

- The apex court censured Tamil Nadu and Kerala for approaching it with administrative problems of the Mullaperiyar dam that supplies water to both states. The case was brought by Kerala after sudden release of water by Tamil Nadu. The Supreme Court will examine the issue on a statutory basis.

- The Supreme Court asked the Centre and several states to respond to a public interest litigation on the insulation of power cables in protected areas of the country, to reduce elephant deaths due to electrocution.

### HIGH COURTS

- The High Court of Karnataka has issued a notice to the state and Union governments to respond to a petition filed by 170 doctors challenging the one year rural service mandated by the state law. The doctors allege that the requirement was sudden and hence seek exemption.

### So far...

Number of cases on environment and development tracked from January 1 to January 13, 2022

| NATIONAL GREEN TRIBUNAL | SUPREME COURT | HIGH COURTS |
|---|---|---|
| 22 | 5 | 8 |

FOR DETAILED VERDICTS, SCAN

By Snigdha Das, Dakshiani Palicha, K M Sheeja, Susan Chacko and Sanjit Kumar

# VOICE OF SILENT VALLEY

## M K Prasad spread environmental consciousness until his last breath

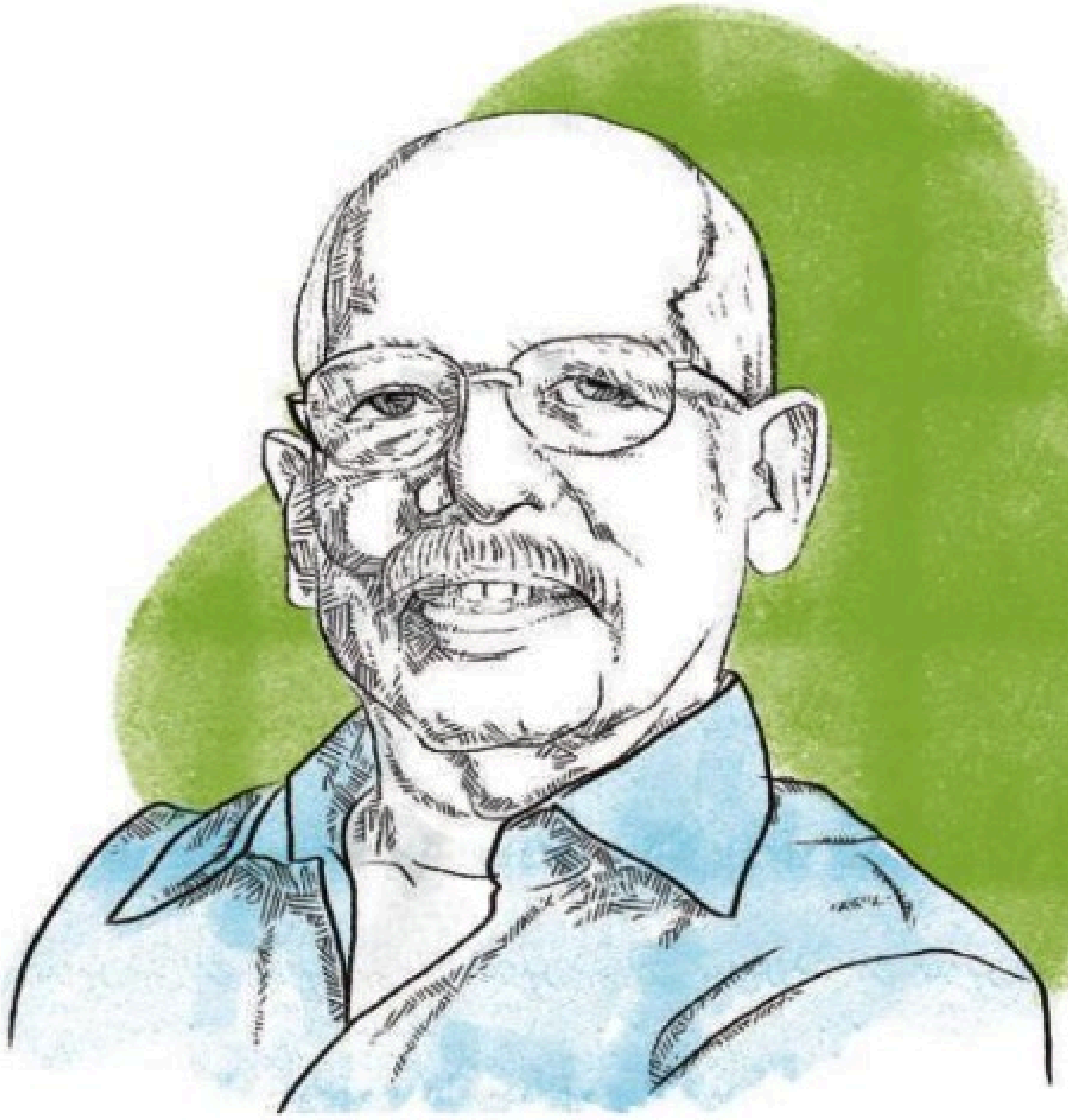
### BY K A SHAJI

ON JANUARY 15 this year, Kerala-based environmentalist M K Prasad signed a letter presented by a group of citizens and development professionals to the state's Chief Minister Pinarayi Vijayan. The letter raised apprehensions about the proposed multi-crore high-speed rail project, Silver Line, which Prasad and the other signatories say would spell disaster for the state in multiple ways. Two days later, the 89-year-old succumbed to COVID-19-related complications at a private hospital.

A celebrated botany professor, Prasad had a rich legacy of environmentalism since the 1970s. While teaching at the University of Calicut, he wrote an article in Malayalam weekly *Mathrubhumi* on severe environmental and social costs of a mega hydroelectric power project planned in Silent Valley National Park in Palakkad district. The article evoked public response and ignited India's first successful movement against a dam project. Then prime minister Indira Gandhi scrapped the project in 1984.

Silent Valley is now a living memorial of Prasad's insights, passion and commitment. In an interview with *Down To Earth* in 2019, he said, "The Silent Valley movement has deeply influenced the developmental and environmental priorities of the state over the years. Even now, it is challenging in Kerala to push forward environmentally unfriendly measures." He was proud that the movement had inspired similar protests against mega-dam projects in Uttarakhand and on the Narmada. "India needs environmental literacy. Now, powerful dam lobbies are finding acceptance through campaigns in social media. Even our normal political discourses lack objectivity and authenticity these days," he said.

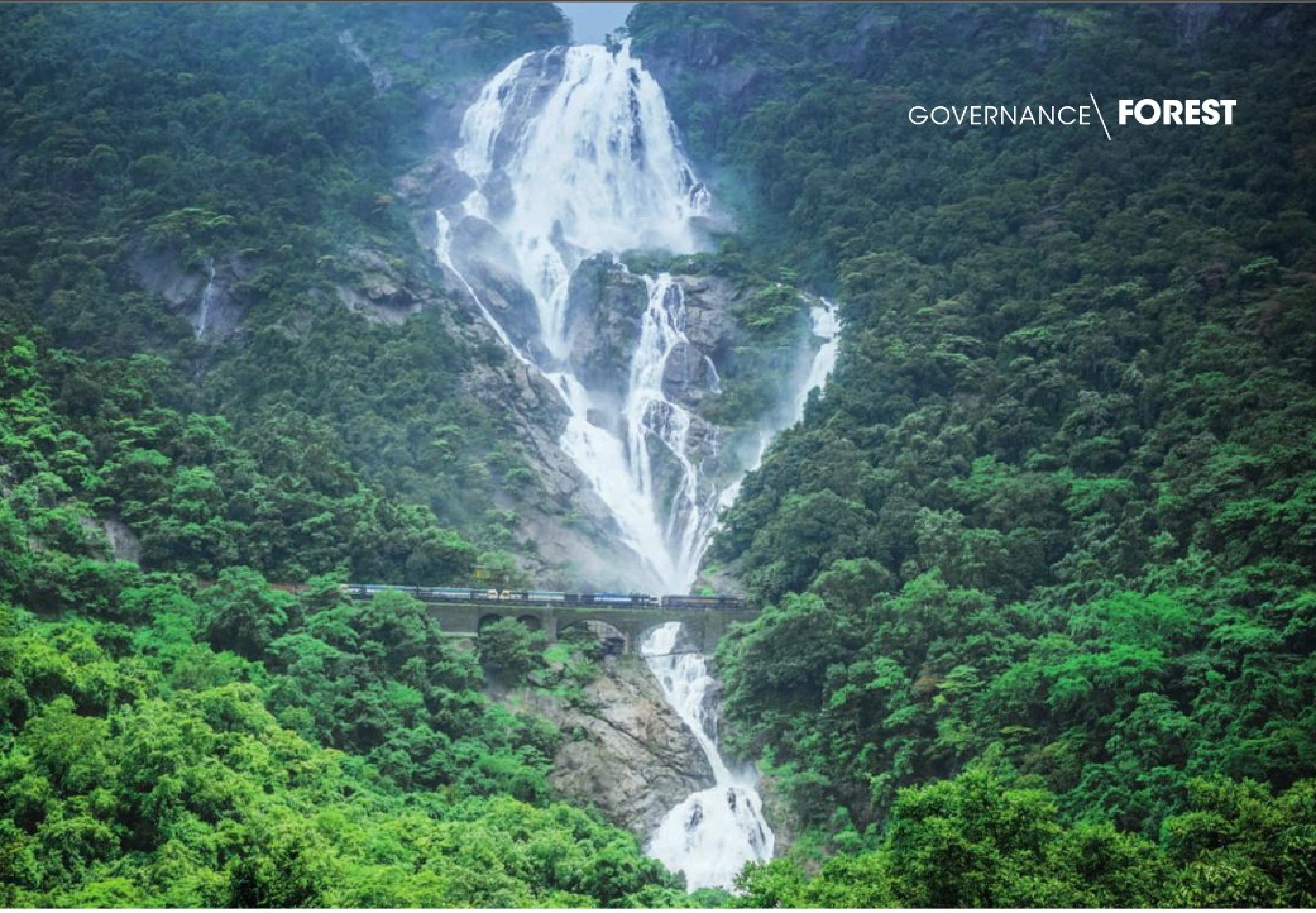
Throughout his life, Prasad travelled across Kerala to promote environmental education. He was pro-vice-chancellor of the University of Calicut in the 1970s and a long-term principal of Kochi's prestigious Government Maharaja's College. He also remained at the forefront of environmental agitations and turned environmentalism into a mass movement as one of the founders of popular science initiative Kerala Sasthra Sahithya Parishad. He established the Integrated Rural Technology Centre in Palakkad and was its director for three years. He was also an active member of the World Wide Fund for Nature, International Union for Conservation of Nature, Centre for Environment Education's governing council and the Kerala State Biodiversity Board. He chaired the Programme Advisory Committee of the M S Swaminathan Research Foundation's Community AgroBiodiversity Centre in Wayanad district. He wrote numerous books and monographs on environmental issues and popular science, and encouraged studies and projects that enhance livelihood options for the oppressed.



**M K PRASAD (1932-2022)**

ILLUSTRATION: RITIKA BOHRA / CSE

Prasad believed his biggest failure was his inability to convince political leaders in Kerala of the need for conservation while pushing for infrastructure projects. "Right from the days he initiated the Silent valley movement and raised environmental consciousness, Prasad did not take a single moment of rest," says Sreedhar Radhakrishnan, coordinator of Kerala Paristhithi Aikya Vedi, an umbrella organisation of environmental groups. "We lost a dedicated fighter who used all his energy to evolve a new consciousness for land, water and air. We are indebted to him for the leadership he provided to conservation movements at the national level," he adds. DTE @downtoearthindia



# Patchy growth

Forests and trees now cover one-quarter of India's geography. But this is not necessarily good news

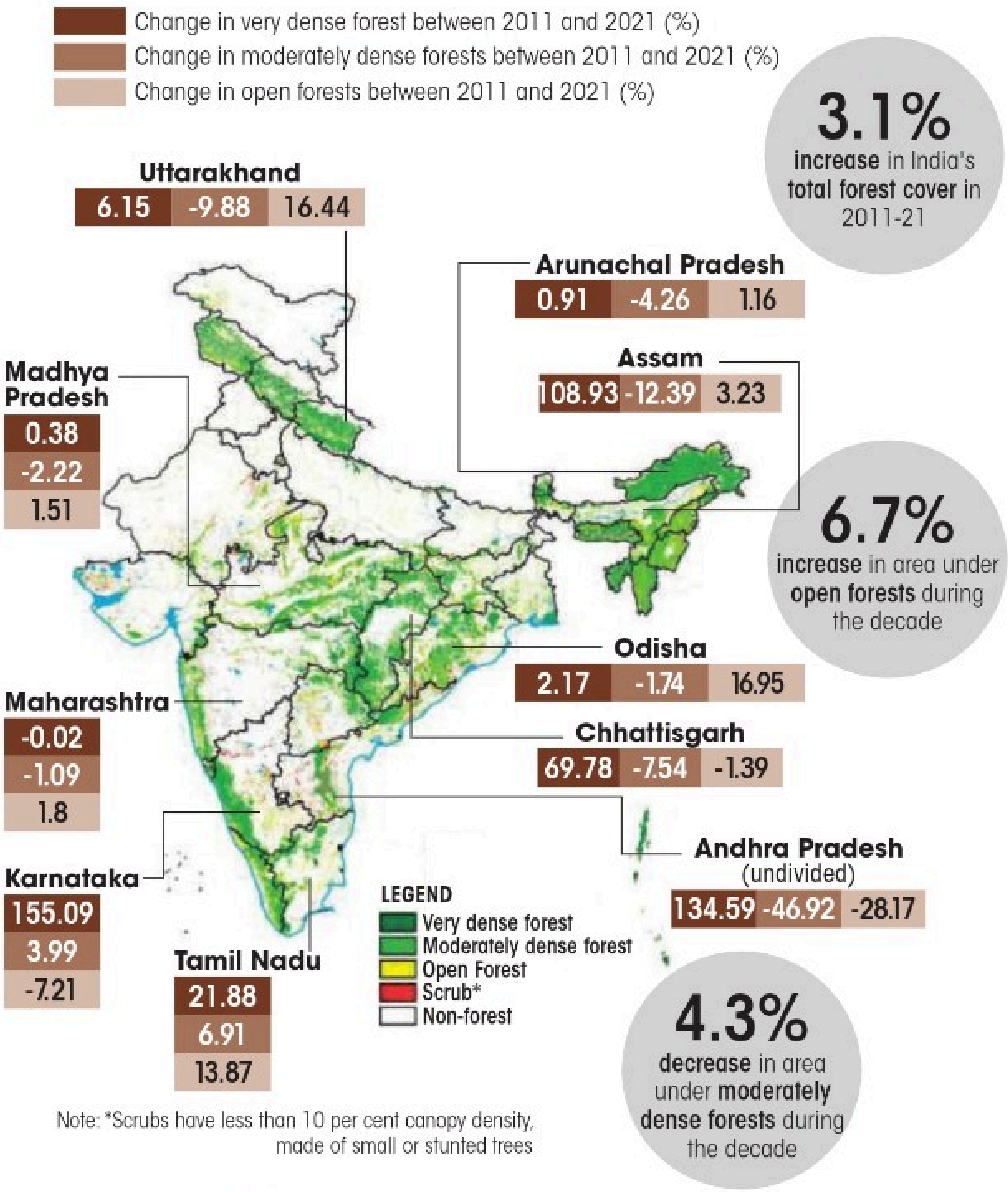
**KIRAN PANDEY** AND **SHUCHITA JHA,** NEW DELHI

INDIA HAS increased its forest cover by an area roughly twice the size of Delhi in the past two years, suggests the "India State of Forest Report 2021", released on January 13, 2022, by the Forest Survey of India (FSI). As a result the country's forest and tree cover has risen to 809,537 sq km or 24.62 per cent of total land area. While releasing the report, Union Minister of Environment, Forest and Climate Change Bhupender Yadav claimed that his government has not only increased the forest cover but qualitatively enriched it. A closer look at the report's findings, though, suggests that there is not much to celebrate.

First, this marginal increase still falls far short of what is needed to meet national and global targets. According to the National Forest Policy, 1988, the country must have 33 per cent of its geographical area under forest and tree cover. The same has been listed as an indicator under the UN's Sustainable Development Goal 14 (Life on land) as well as the "Strategy for New India@75"

## UNEVEN GREEN COVER

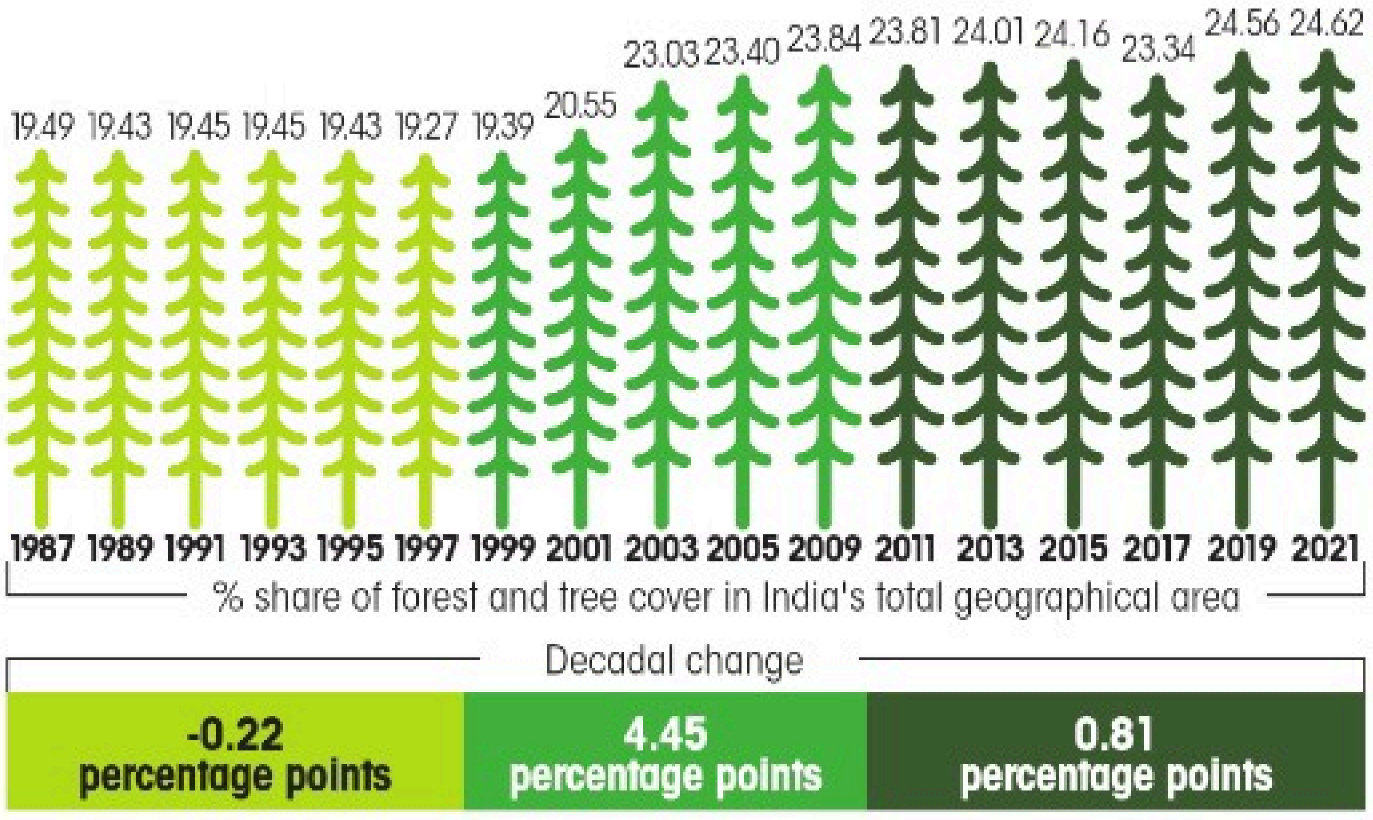
Seven of 10 states with most forest cover have seen a rise in open forests, while only two states have seen a rise in moderately dense forests


Change in very dense forest between 2011 and 2021 (%)
Change in moderately dense forests between 2011 and 2021 (%)
Change in open forests between 2011 and 2021 (%)
Uttarakhand 6.15 -9.88 16.44
Arunachal Pradesh 0.91 -4.26 1.16
Assam 108.93 -12.39 3.23
Madhya Pradesh 0.38 -2.22 1.51
Odisha 2.17 -1.74 16.95
Chhattisgarh 69.78 -7.54 -1.39
Maharashtra -0.02 -1.09 1.8
Andhra Pradesh (undivided) 134.59 -46.92 -28.17
Karnataka 155.09 3.99 -7.21
Tamil Nadu 21.88 6.91 13.87
3.1% increase in India's total forest cover in 2011-21
6.7% increase in area under open forests during the decade
4.3% decrease in area under moderately dense forests during the decade
LEGEND
Very dense forest
Moderately dense forest
Open Forest
Scrub*
Non-forest

Note: *Scrubs have less than 10 per cent canopy density, made of small or stunted trees

## MARGINAL RISE

Progress has been slow in the last decade, raising doubt on whether India will reach its goal of 33% forest and tree cover by 2030



Source: India State of Forest Report 1987 to 2021, Forest Survey of India

released by government think tank NITI Aayog in December 2018, with 2030 as the deadline. In fact, an analysis of forest and tree cover trends from 1987, when the first FSI report was released, to 2021 shows that in 34 years, the cover as share of its geographical area has risen by just 5 percentage points.

Progress in 2011-21 has been awfully slow at just 0.81 percentage points (see 'Marginal rise'). As per the 2021 report, only 17 states and Union Territories have forests covering more than 33 per cent of their geographical area, of which five have over 75 per cent.

"During Independence there was just 19 per cent forest and tree cover when the population was around 3 million. By 2021, we have added 1 billion more people but the cover stands at 24 per cent," says Abdul Qayum, deputy conservator of forests, Chandigarh Forest and Wildlife Department. "Achieving the target of 33 per cent will take a lot of time," he says.

Second, the report says many states are gaining trees and forest cover due to agroforestry and plantation activities to make up for losses due to agricultural, anthropogenic and developmental activities. For example, says Qayum, forests are being felled for a four-way highway being constructed in the Northeast, and the airport being built in Itanagar, Arunachal Pradesh. To balance this, plantations are being set up elsewhere. But since they are in a nascent stage, the report has not considered them in its assessment.

However, Kanchi Kohli, a researcher at the Centre for Policy Research, Delhi, says plantations in lieu of development are done mostly for revenue generation from trees and should not be considered as a replacement for forests.

“Forests are much more than trees, they are an ecosystem that provide water, food security and home to all many life forms. Agroforestry practices can bridge the gap between tree farming and forests, especially to maintain ecological continuity," she says. "However, this cannot legitimise the degradation and diversion of existing forests,” she adds.

Experts also raise concerns on the veracity of the report’s data, saying FSI's definition of “forests” is misleading. Since 2001, it considers all patches of land with tree canopy of more than 10 per cent and area of more than 1 hectare, irrespective of land use, ownership and species of trees, as forests.

M D Madhusudan, conservation scientist with the National Centre for Biological Sciences in Bengaluru, says because of this definition, FSI even considers the private tea estates in Assam, West Bengal and Tamil Nadu, coconut plantations in Lakshadweep and areas in Gujarat taken over by the invasive species *Prosopis juliflora* as forests. “Are all these also being treated as forests? Do the forest laws apply to them?” he asks during a conversation with *Down To Earth*.

Moreover, since 2001, FSI has used better techniques (digital, in place of visual) and higher scale (1:50,000 in place of 1:250,000) to interpret satellite data for its analysis. Several "new" patches of forest cover (and several blanks inside forested areas) were identified in the 2001 report. But satellite data does not show who owns the land or what kind of land use is being practised under the tree cover. Such verification at the national level is a mammoth task and may take years to complete, the 2001 report acknowledges.

## FEWER DENSE FORESTS

Analysis of FSI reports from 2011-21 shows an increase in forest cover by 3.1 per cent only. While 22 states recorded an increase in forest cover, 12 states saw a decrease—seven from the Northeast. Nagaland, which accounts for nearly 29 per cent of the forest cover in the region, lost over 8 per cent of its forests.

Even the overall increase in forest cover has largely been led by the rise in open forests, says the report. FSI classifies forests into open forests (10-40 per cent tree cover), moderately dense forests (40-70 per cent), very dense forests (over 70 per cent). In the recent decade, there has been an increase of 6.7 per cent in open forests, but a 4.3 per cent decrease in area under moderate forests (see 'Uneven green cover', p16). “In 2021, the increase in forest cover has been observed in open forest followed by very dense forest. Top three states showing increase in forest cover are Andhra Pradesh (647 sq km), followed by Telangana (632 sq km) and Odisha (537 sq km),” Yadav said while releasing the report.

Between 2011-21, the area under moderately dense forests as share of total land area has decreased by 13,846 sq km. Ten states recorded an increase in their area under these forests, while 24 states recorded a decrease. Says Kohli, “Density is not the only parameter to understand the ecological, social or economic importance of forests. Open forests may have lesser tree cover than rainforests, but they are of no less significance. So, we need to map the loss and gain of a decline of one kind of forest over others.”

**MANY STATES HAVE GAINED TREE AND FOREST COVER DUE TO AGROFORESTRY AND PLANTATION ACTIVITIES TO MAKE UP FOR LOSSES DUE TO AGRICULTURAL, ANTHROPOGENIC AND DEVELOPMENTAL ACTIVITIES**

## CLIMATE CONUNDRUM

The 2021 report for the first time assessed forests that can emerge as “climate hotspots” or are expected to be affected by climate change. “This serves as the baseline for state governments to incorporate climate change in their land and development policies,” Chandra Prakash Goyal, director-general of forests at the Union environment ministry, writes in his foreward to the report. The projections in the report are based on a collaborative study by FSI and the Birla Institute of Technology & Science (BITS), Pilani's Goa campus. It says by 2030, some 315,667 sq km or 45 per cent of India’s forest and tree cover are set to emerge as climate hotspots. By 2050, about 448,367 sq km or 64 per cent of the cover is likely to face the high severity (1.5-2.1°C rise) of climate change. These hotspots will also see a change in rainfall patterns.

Some 84 per cent of Chhattisgarh’s forest area is most likely to become a climate hotspot, while in Madhya Pradesh, 65 per cent of the forest area will be vulnerable. Himalayan states and Union Territories like Ladakh, Jammu and Kashmir, Himachal Pradesh and Uttarakhand will record the maximum increase in temperature and possibly a decrease in rainfall. Extreme rainfall may also increase in the North East.

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PHOTOGRAPHS: VIKAS CHOUDHARY / CSE

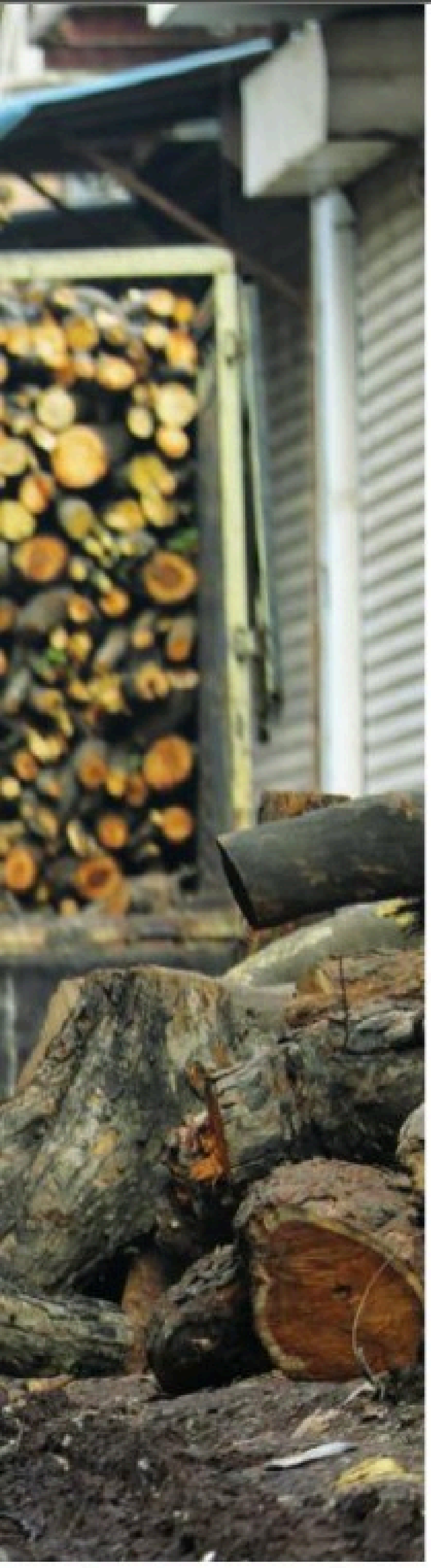
# LOST IN THE WOODS

## India continues to import timber, often illegally, even though its domestic wood stock can easily help achieve self-reliance

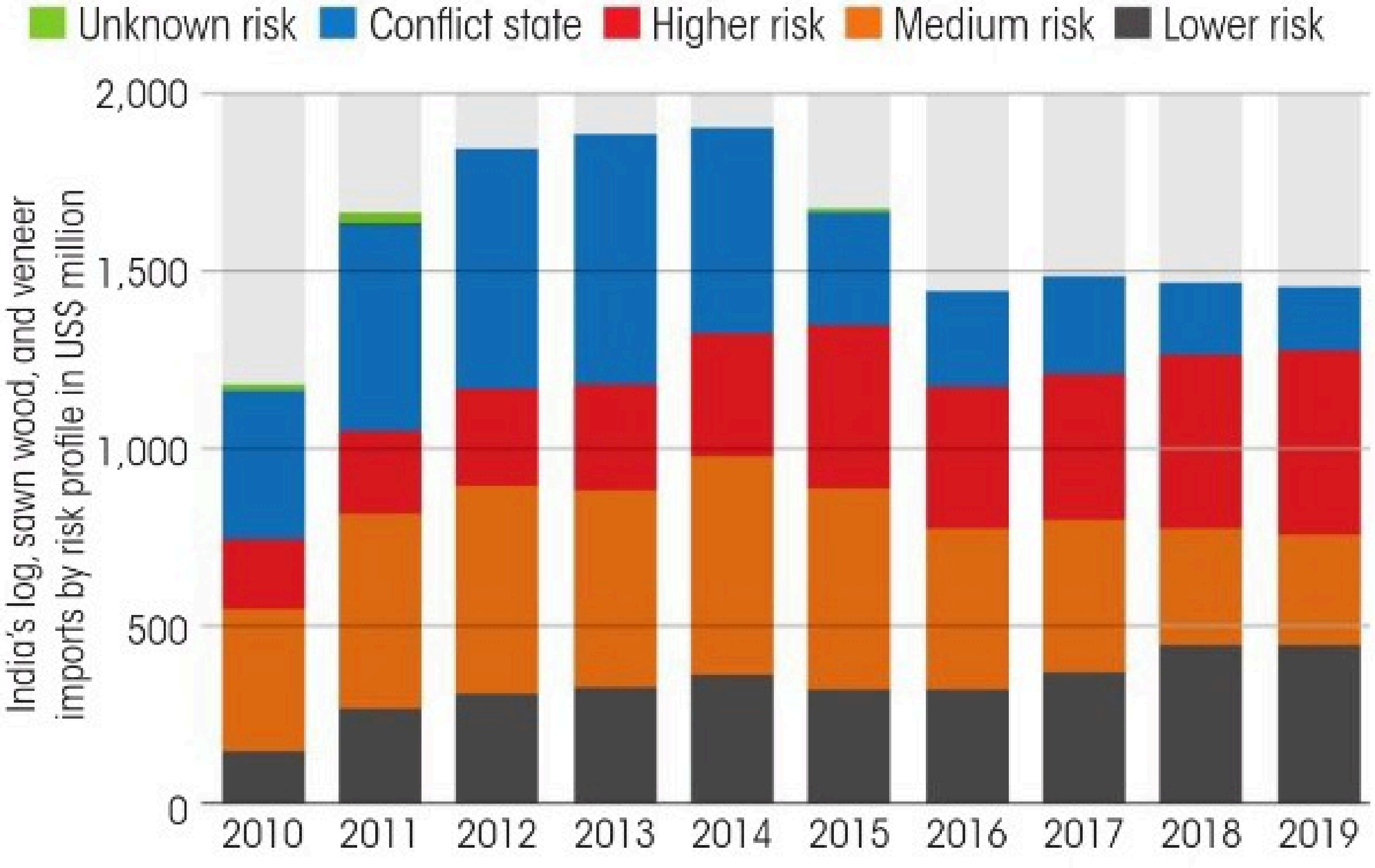
**SHUCHITA JHA**, NEW DELHI

A VARIETY OF sweet and mossy smells welcomes everyone visiting the timber market of Kirti Nagar in Delhi. The traders boast of stocking the choicest of wood sourced from across the world. "We sell *marandi* (white cedar wood) imported from Malaysia and Indonesia, pine from New Zealand, maple wood from Canada, teak and several other timber from South America and Africa," says Vikram Verma, secretary of the New Timber Trade Marketing Association in Kirti Nagar.

Though the overall demand for wood and associated products has remained stagnant, their demand for furniture, panels and plywood has increased by 25 per cent in the country in the past five years—to 20.32 million cubic metres (cu m) in 2020 from 16.32 million cu m in



Delhi's furniture market in Kirti Nagar sells timber varieties imported from Malaysia, Indonesia, New Zealand, Canada, and several South American and African countries



**TERRIBLE PRACTICE**

Around 42% of India's timber imports in 2019 were sourced from countries at high risk of illegal logging or from conflict states

Source: UN Comtrade 2019, compiled by Forest Trends 2020

2016, as per the "India Timber Supply and Demand 2010-2030" report released by International Tropical Timber Organization (ITTO), an inter-governmental body. The bulk of this demand is met through imports. The import of rough sawn wood, the most important component in timber trade, has increased 6.5-fold in the past decade—to more than 1.5 million cu m in 2019 from less than 0.2 million cu m in 2009. The import of veneer sheet, an indispensable product for the plywood industry, has seen a 265-fold rise—from 20 million kg in 2009 to 320 million kg in 2019. The import of fibreboard has also doubled during the 10-year period, says the ITTO report.

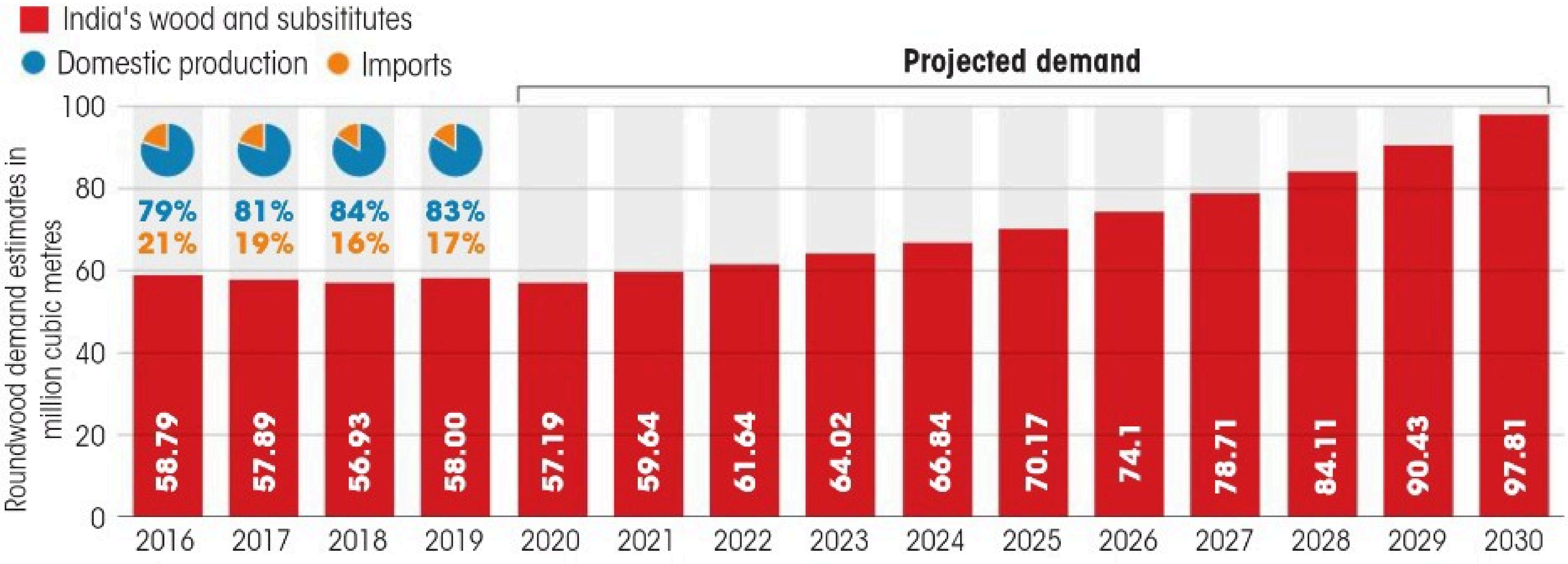
India produces about 47 million cu m of roundwood and associated products a year, while their annual demand is 57-58 million cu m. This supply-demand gap is met by the imports of roundwood, sawn wood, veneers, plywood, furniture, wood pulps and others, says Promode Kant, a former Indian Forest Services bureaucrat and one of the two authors of the ITTO report. Though imports fell in 2020-21 due to the novel coronavirus outbreak, they have returned to the earlier levels in the current financial year.

India's import dependence defies the fact that its volume of living trees, referred to as the growing stock, has steadily increased since 2013 and now stands at 6,167.5 million cu m, as per the recently released "India State of Forest Report 2021". India's import dependence has particularly increased over the past three decades due to a series of policy developments. First, the domestic production started to decline in the 1980s with the introduction of the National Forest Policy, 1988, which recommended that the supply of forest produce at concessional price should cease. "The annual harvest of timber from forests declined from 10 million cu m in the 1970s to 4 million cu m by 1990," writes R K Sapra, a former Indian Forest Service bureaucrat and one of the other authors of the ITTO report. In 1996, the Supreme Court placed further restrictions on harvesting from forests. One of the landmark verdicts delivered in the *Godaverman vs Union of India* case re-defined the meaning of forests and extended protection to all areas with natural forests, irrespective of their ownership. The same year, to reduce the demand for timber from natural forests, the Union government classified wood under the "open general licence", making it freely importable without restrictions and licence.

Today, it is easier to import wood than increase domestic production. While this arrangement has worked so far, it might not last long. India's demand for wood and wood products will almost double to 97.81 million cu m in 2030 from 58 million cu m in 2019, as per the ITTO report (see 'Growth pangs',

## GROWTH PANGS

India relies on imports to meet 20 per cent of its demand. As the domestic demand is set to double in the next decade, a commensurate increase in imports will add a huge burden on the exchequer, fuel illegal trade



Source: India Timber Supply and Demand 2010-2030 by International Tropical Timber Organization

*p*20). This will further increase the country's dependency on imports, adding a significant burden on the exchequer—India's spending on timber imports has increased by 10 per cent to US $4,350 million between 2011-12 and 2019-20—and fuelling illegal trade.

## SET TO BACKFIRE

India is the 20th largest importer of wood and wood products in the world, says Hugh Speechly, UK-based expert on forests and wood trade. Worryingly, it is also the third largest importer of illegally harvested wood, after China and Vietnam, as per "India's Wooden Furniture and Wooden Handicrafts: Risk of Trade in Illegally Harvested Wood", a report by US-based non-profit Forest Trends.

In 2019, at least 42 per cent of the timber India imported was illegally harvested, states the report released in September 2020 (see 'Terrible practice', *p*19). It adds that 44 per cent of logs, 42 per cent of rough sawn wood and over 75 per cent of veneer imports were sourced from countries assessed as being at high risk for illegal logging based on governance, corruption and harvest indicators, or from conflict-affected regions, as per the World Bank.

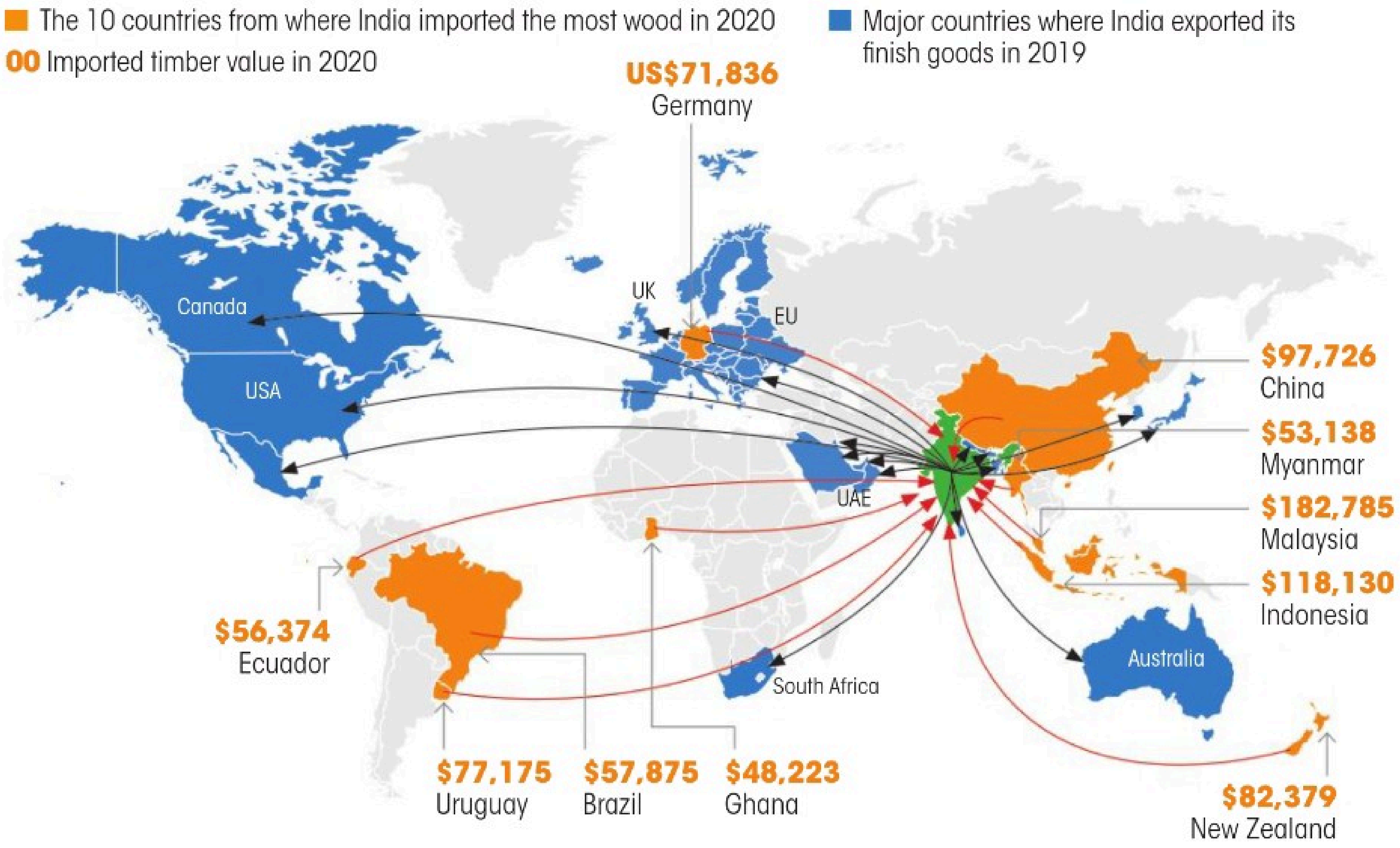
The list of high-risk countries exporting to India includes Malaysia, Brazil, Ecuador, Myanmar, Papua New Guinea, Gabon, Suriname, Ukraine, Solomon Islands and Russian Federation, says Speechly (see 'Major players'). These countries account for almost 27 per cent of India's timber imports. In Gabon, for example, Indian companies have invested heavily since 2018 to promote the production of veneer and other wood products. The country's forestry sector has long been critiqued for widespread corruption, and illegal sale of timber internationally.

The cost of trading in illegally harvested timber is astronomical to the biodiversity. India imported over 250 species of logs, sawn wood and veneer between 2016 and 2019. Among these, the International Union for Conservation of Nature Red List classifies 171 species as near threatened, vulnerable, endangered or critically endangered, states the Forest Trends report. Nearly 60 per cent of India's log imports and 20 per cent of sawn wood imports between 2016 and 2019 were sourced from countries with active export restrictions in place, it adds.

Such illegal trade is likely to hurt Indian industries as the country exports a substantial quantity of finished wood products to several developed countries that have regulations designed to exclude illegally logged timber from their markets. In 2019, of all the timber products India exported, 78 per cent were shipped to countries that have strict measures to check illegal timber, states the Forest Trends report. These countries include the US, which in 2008, became the first to ban trade in illegally sourced wood products by amending the Lacey Act, 1900, that prohibits illegal wildlife. In 2012, US guitar company Gibson was fined $300,000 for illegally importing ebony from Madagascar and rosewood and ebony from India. In March 2013,

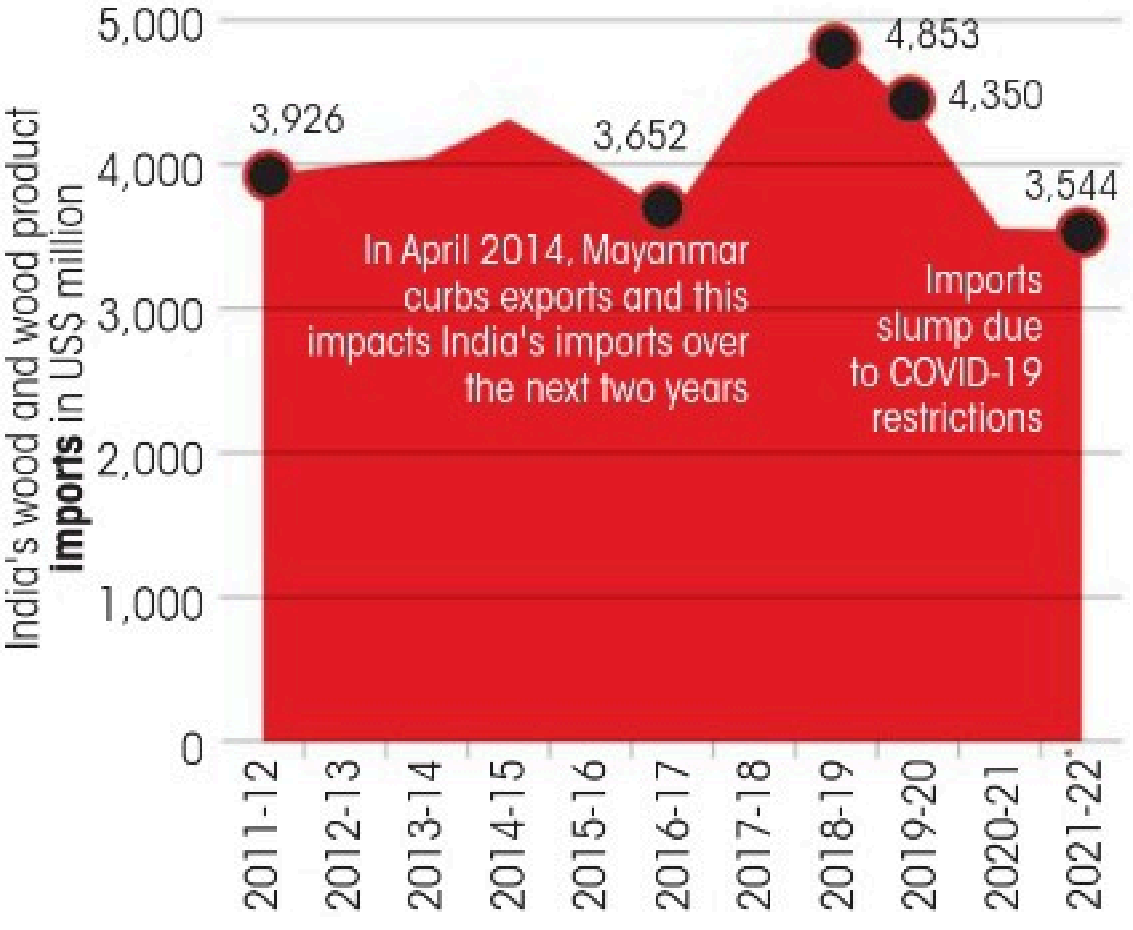
# MAJOR PLAYERS

India imports wood and other raw materials such as plyboard and veneer and exports finished products such as handicraft and furniture to several developed countries


🟧 The 10 countries from where India imported the most wood in 2020
**00** Imported timber value in 2020
🟦 Major countries where India exported its finish goods in 2019
**US$71,836**
Germany
UK
EU
Canada
USA
UAE
South Africa
Australia
**$97,726**
China
**$53,138**
Myanmar
**$182,785**
Malaysia
**$118,130**
Indonesia
**$56,374**
Ecuador
**$77,175**
Uruguay
**$57,875**
Brazil
**$48,223**
Ghana
**$82,379**
New Zealand

## HEFTY PRICE

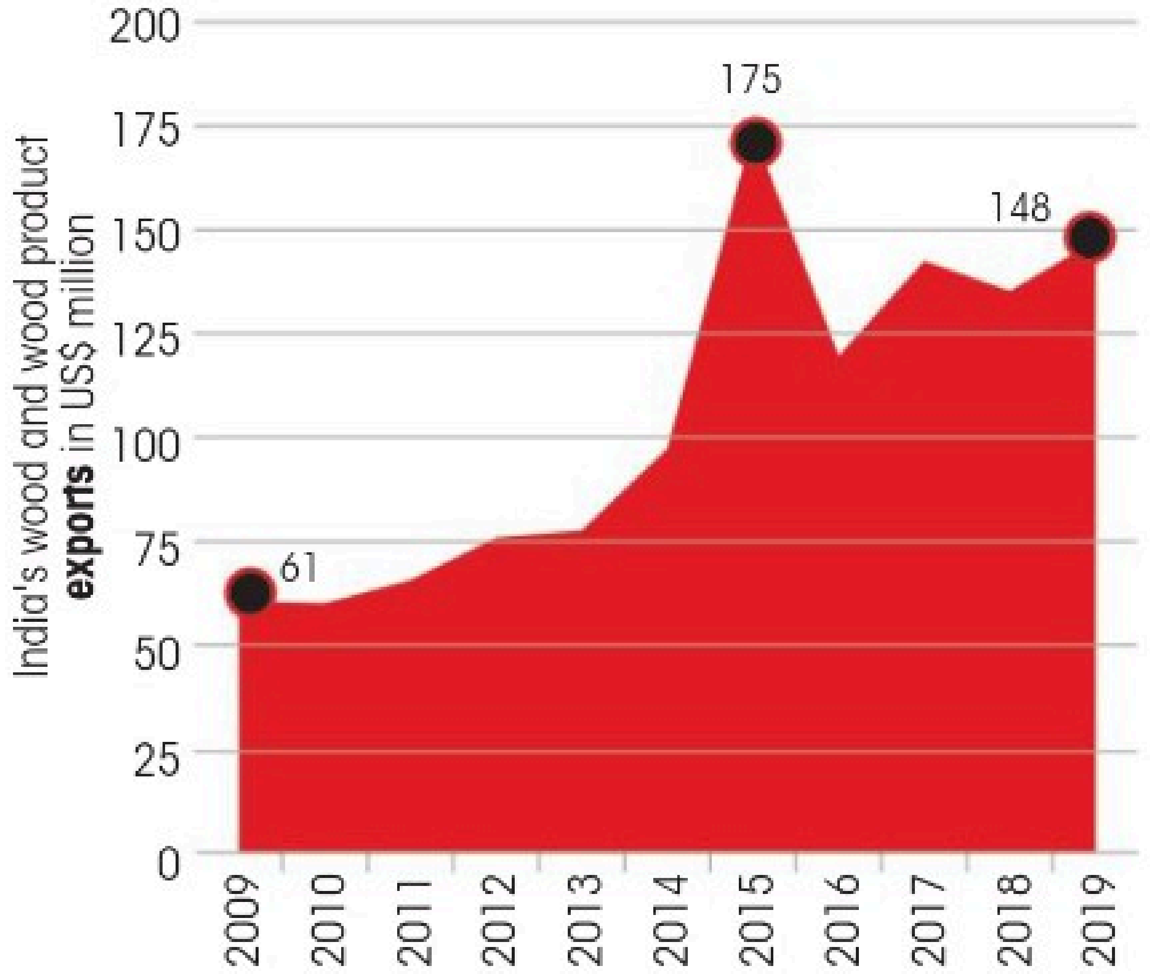
India's spending on wood imports has increased by almost 25 per cent between 2011-12 and 2018-19



*April - November

## RAPID DEMAND

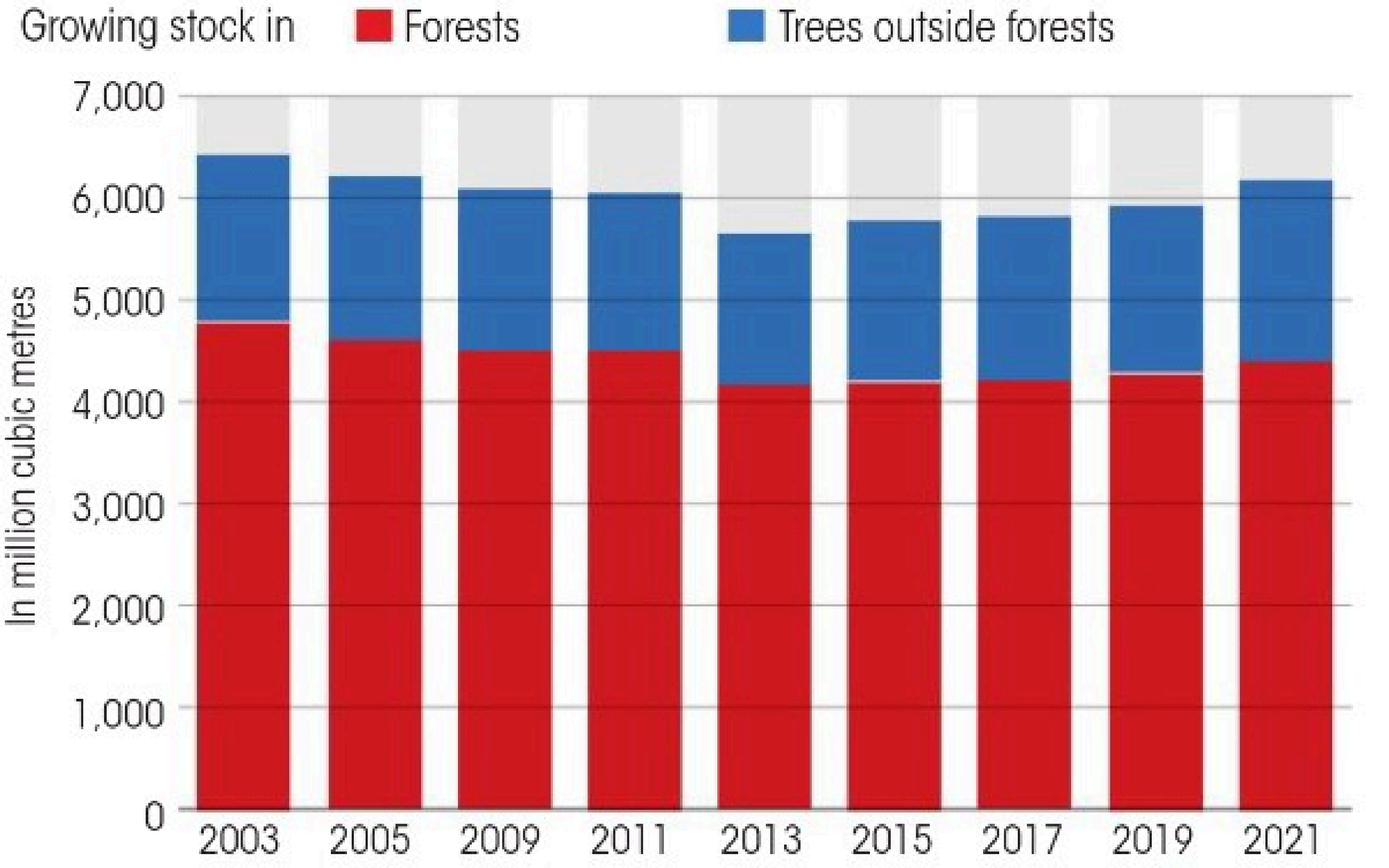
India's income from wood exports has increased by 143 per cent between 2009 and 2019



Source: Union Ministry of Commerce and Industry, UN Comtrade, India Timber Supply and Demand 2010-2030; Numbers rounded off to nearest whole number

## VISIBLE CHANGE

India's growing stock, which is volume of all living trees, has steadily increased since 2013



Source: India State of Forest Report; 2003 to 2021

the EU set up the European Timber Trade Regulation to ensure that no illegal timber or its products could be sold in the region. Australia and Japan also have provisions in place.

Supplying countries are also trying to curb illegal logging and this has impacted Indian trade. Myanmar accounts for nearly half of the world's natural teak forests. In 2014, to put an end to illegal felling, the government imposed an export ban and significantly reduced the annual allowable cutting of teak forests. This dealt a blow to the timber imports of India, which depended on Myanmar for almost one-third of its teak needs between 2010 and 2014. To bridge the gap, India now imports teak from 50 countries and has directly invested in Myanmar mills.

## SEE THE WOOD

Kant, who now teaches at the Advanced Institute of Wildlife Conservation, Chennai, contends that India can easily relinquish the need to import wood altogether. He says that the country should look at its forests to ramp up domestic production. India's growing stock is 6,167.5 million cu m, of which 4,388.15 million cu m lies in forests and 1,779.35 million cu m lie outside forests and are managed either by individuals or government corporations (see 'Visible change'). Yet, forests account for only 2 million cu m of the total annual timber production. The remaining 45 million cu m is from trees outside forests.

"Sustainable harvesting is permitted in forests except where specifically banned (such as in national parks and sanctuaries). At least 1 per cent (42 million cu m) of total growing stock should be available for harvesting sustainably. Even if we assume that half of this is located in ecologically sensitive forests, 21 million cu m could still be available," says Kant. He adds that forests are full of old trees, dead and dying, and using them as timber decreases the chances of a forest fire. "Even thinning of very dense plantations, which is a required silvicultural operation, is not being carried out in most forests for various reasons. If forestry is practiced scientifically, our forests can be healthier," he says.

Increased production will also generate rural employment opportunities. "When wood is imported only the people living close to a few harbours benefit. When forests are harvested it generates employment for the rural population," Kant says.

Sapra says India's forest cover is growing mainly due to an increase in trees outside forests, where primarily short-rotation species (less than 10 years) are grown. As a result, India remains import dependent for medium- (20 years) and long-rotation (40 years) timber.

The country's overall focus, though, remains on ramping up tree farming. In 2014, the Centre released an agroforestry policy, but it is riddled with problems. "Small farmers do not have enough land to practice agroforestry. The trees create shadows and their roots make the fields uncultivatable, so agroforestry is not practical for these farmers," says a researcher from the State Forest Research Institute, Jabalpur, on anonymity. He adds that the policy should be also have solutions and incentives for small farmers.

Calling it an institutional handicap, A Arunachalam, director of the Central Agroforestry Research Institute, Jhansi, says the agroforestry policy is implemented as a Sub-Mission on Agroforestry to go along with the National Bamboo Mission, which has no defined plan. Sapra says India must aggressively promote production of large-sized wood on farmlands by providing incentives like subsidies and tax concessions to tide over its timber imports. DTE

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# HOPE DEFERRED

With the pandemic near endemicity, an effective and widely available treatment for COVID-19 would be a significant breakthrough for managing the viral infection. Are we there yet?

**TARAN DEOL,**
NEW DELHI

THE FIGHT against COVID-19 has reached a turning point with the approval of two oral antiviral treatments, molnupiravir and a combination of nirmatrelvir and ritonavir (available under the brand name Paxlovid). With the promise to reduce the risk of hospitalisations and deaths, these pills could well help manage the pandemic, but they cannot end it—not alone.

Clinical-trial data shows that molnupiravir, developed by the US-based pharmaceutical firm Merck and biotechnology company Ridgeback Biotherapeutics, cuts the risk of hospitalisation or death by 30-50 per cent. Paxlovid, developed by another pharmaceutical and biotechnology giant Pfizer, cuts the risk by 88 per cent. Since the UK regulators approved molnupiravir in November and Paxlovid in December last year, and the US regulators granted emergency use authorisations (EUA) for both drugs in December, several other countries, struggling to contain rising cases due to the Omicron variant of the novel coronavirus (SARS-COV-2), have followed suit. Since the pills are in short supply, wealthy countries have already locked in huge contracts, as they did with COVID-19 vaccines, and the others are negotiating with the drug makers to manufacture generic versions. The UN Medicines Patent Pool that aims to improve access to medication has freed molnupiravir's patent for low- and middle-income countries.

But there are some who are treading cautiously. Till the third week of January 2022, India had not given approval to the use of Paxlovid. Though an EUA was granted for molnupiravir, it was not made part of the national COVID-19 treatment protocol. Several companies in the country have, however, started making the drug available for anywhere between ₹1,600 and ₹3,000 per course.

The reason for their reluctance is that experts are still divided over the safety of the pills. "Successful antivirals have typically targeted two key pieces of a virus's biological machinery, a polymerase and a protease, both of which are essential for viral replication. The current COVID pills are no exception: Paxlovid inhibits SARS-COV-2's main protease, whereas molnupiravir tricks its RNA polymerase into incorporating part of the drug into the virus's RNA, creating so many errors that it cannot survive," notes an article published in *Nature* on January 21.

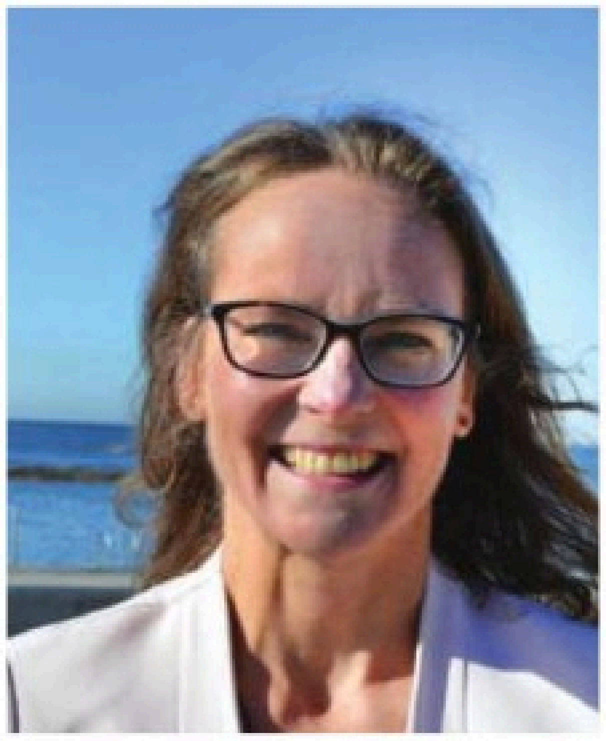
Several researchers, including those from the Indian Council of Medical Research, have raised concerns that molnupiravir that introduces errors in the viral RNA could also mess with human genetic material and lead to mutations. This might pose risks to the developing foetus if the drug is administered to pregnant women, or cause damage to cartilage. Similarly, "Paxlovid is associated with several drug-drug interactions, which could complicate its use in the community," says a January 13, 2022 study published in *The Lancet*.

Other than the side effects, these pills, like most other therapies used to treat COVID-19, work only on alleviating symptoms by reducing the viral load, rather than eliminating the virus itself.

# 'Need vaccines and drugs'

## A combination of both COVID-19 strategies will help circumvent issues of access and affordability

**JENNIFER H MARTIN**



The COVID-19 pandemic has challenged our established systems, demanding immediate action and leaving little time to consider and assess its overall impact or strategic opportunities.

At first, it could appear to some that vaccines are not very effective in controlling the pandemic as they lose efficacy with mutations. However, this is an over-simplification of the problem. Mutations would have been less common if the vaccine could be rolled out equally to all people in all countries in an efficient way. Also, some vaccines seem to be more effective than others and provide immunity for longer. However, these are expensive and in short supply, so companies preferentially sell them to wealthier countries. For countries with lower socio-economic status, vaccines remain unaffordable despite COVAX, the global initiative for vaccine equity.

It is then pertinent to ask whether effective drugs would have reduced spread and mutations. We can tackle COVID-19 with one of two broad strategies. The first includes antivirals and the other is to treat the host by controlling the body's response to the virus. Many pharmaceutical companies have antivirals in their library. These are often failed therapies developed for other viruses but as safety information is already available, companies can apply relatively quickly for provisional approval, with less clinical data than what is required for a full approval. However, these are likely to be expensive when available.

Thus, "treat the host" drugs with cheap, off-patent anti-inflammatory agents such as heparins, statins, steroids, antidepressants and angiotensin blockers could be the way forward. If we had focused more on repurposing the right drugs, we could have developed effective therapies earlier and made them accessible.

In the future, a combination of both vaccines and drugs will help us survive. Everyone needs vaccination to reduce deaths, disability (including long COVID), transmission and hospitalisation. Developed countries have a duty through COVAX to support the global vaccine effort. However, there will be breakthrough infections and some people will not get a shot or develop adequate immune response.

Antivirals (when available) will be useful to prevent infection at big transmission events or for people who are still at high risk for getting sick despite being vaccinated (like those receiving chemotherapy). These will be expensive and only a few countries will be able to afford them. Then "treat the host" drugs that reduce hospitalisations, intensive care or death will be needed as a bridge.

*(Jennifer H Martin is a clinical pharmacologist, University of Newcastle, Australia)*

# IMPACT IN QUESTION

Widespread use of repurposed antivirals and monoclonal antibodies with reduced efficacy against Omicron points to a lack of proper research and development in COVID-19 therapeutics

| Name | Status | Efficacy |
|---|---|---|
| **Antivirals and anti-inflammatory drugs** | | |
| Remdesivir (repurposed) | Emergency Use Authorisation (EUA) by US Food and Drug Administration (FDA) | Believed to shorten hospital stay by 5 days and thus lower risk of dying. However, some scientific studies argue otherwise |
| Favipiravir (repurposed) | EUA in some countries | Minor tolerable side effects, but unclear if it reduces hospital stay or halts disease progression |
| Fluvoxamine (repurposed) | EUA by FDA | Helps ease symptoms, reduces hospitalisation risk by 32 per cent |
| Molnupiravir | EUA by FDA | Meant for mild to moderate cases with at least one comorbidity, reduces hospitalisation by 30-50 per cent. But studies note severe side effects |
| Paxlovid | EUA by FDA | If taken within three days of the onset of symptoms, it is believed to reduce hospitalisation by 89 per cent. But study results are yet to be published |
| Baricitinib (repurposed) | EUA by World Health Organization (WHO) | Meant for severe or critical COVID-19 patients combined with corticosteroids. It improves survival and reduces the need for ventilation, with no observed increase in adverse effects |
| **Monoclonal antibodies** | | |
| Sotrovimab | EUA by FDA | To be administered within 10 days after symptoms appear in high-risk groups. It is not effective on hospitalised patients and shows low efficacy against Omicron, but not as significantly as other monoclonal antibodies |
| Casirivimab | Conditionally recommended by WHO for patients with non-severe disease but at high risk for hospitalisation | It reduces death rates for patients who cannot muster an immune response and reduces recovery time, viral load and hospitalisation risk. But distribution has been stopped as it shows low efficacy against Omicron |
| Imdevimab | Conditionally recommended by WHO for patients with non-severe disease but at high risk for hospitalisation | It reduces death rates for patients who cannot muster an immune response and reduces recovery time, viral load and hospitalisation risk. But its distribution has been stopped as it shows low efficacy against Omicron |
| Bebtelovimab | EUA from FDA awaited | Effectively neutralises all variants of the SARS-CoV-2 virus that causes COVID-19, including Omicron |
| Bamlanivimab | EUA from FDA | Shows lower viral load in non-hospitalised patients with mild-to-moderate disease. But US distribution is on pause as it is ineffective against Omicron |
| Etesevimab | EUA from FDA | Shows lower viral load in non-hospitalised patients with mild-to-moderate disease. But US distribution is on pause as it is ineffective against Omicron |
| Evusheld (Tixagevimab+Cilgavimab) | EUA from FDA (for pre-exposure prophylaxis to SARS-CoV-2 infection) | Preliminary results show it remains effective against Omicron, but more data is awaited. |
| Tocilizumab | EUA by WHO | Used to treat severely ill patients with hypoxia |

Source: "COVID-19 Therapeutics Tracker" by the Regulatory Affairs Professionals Society that works on regulation of healthcare products, various scientific studies

Note: This list includes some popular therapies being used globally for COVID-19 treatment

"Till now, there are at least 27 popular treatments that have been tried and tested globally for COVID-19, but none are curative. The treatments till now simply limit the progression of the disease or slow down the viral shedding," Om Shrivastav, consultant, Infectious Diseases at Sir H N Reliance Foundation Hospital and Research Centre in Mumbai, tells *Down To Earth*.

## CHANGE TACK

Since the beginning of the pandemic, the world has put all its eggs in one basket—vaccination. However, it has proved to be an ineffective approach. "The honeymoon period over COVID-19 vaccines is over. We have understood that vaccines are not breaking the transmission of the virus. Moreover, not everybody is vaccinated against COVID-19," says Leena Menghaney, South Asia Head of international public health non-profit Médecins Sans Frontières' Access Campaign. There is also the possibility that we may need repeated booster shots to stay ahead of the virus mutating faster than the speed at which vaccines can be tweaked (see 'Need vaccines and drugs', *p*25). Shrivastav makes a comparison with influenza, which according to the World Health Organization (WHO) kills 650,000 people annually. “Influenza vaccines are widely available, but there is still morbidity. Some part of the population still succumbs to this disease,” he explains. Hence, the next best option to survive with COVID-19 are therapeutics. However, the world lacks significantly on this aspect (see 'Pursuit of a cure', *Down To Earth,* 1-15 October, 2021).

It's bizarre to note that while the world has developed 334 vaccines against COVID-19 since the outbreak of the pandemic—according to WHO'S COVID-19 vaccine tracker and landscape, 140 and 194 vaccines, respectively, are in the stages of clinical and pre-clinical development till the third week of January 2022—only 86 therapeutics are available to fight off the infection. What's worse, a majority of the popular antivirals and anti-inflammatory drugs are repurposed, meaning, they have already been in use for treatment of other diseases. While this expedited their approval, an analysis of some of the therapies being used globally shows that they fall short in efficacy (see 'Impact in question', *p*26). One such example is steroids such as dexamethasone. They have been the preferred treatment for those in severe stages of the disease. However, reckless prescription led to health complications (see 'Pandemic of steroids', *Down To Earth,* 1-15 August 2021).

Reshma Ramachandran, physician-rsearcher at Yale School of Medicine, US, says like several other countries, India has helped make existing therapeutics available quickly by relaxing regulations and lowering the standard for approval. “There have been some indications that India has been considering not just trial results but also pre-clinical data. Such flexibility is appropriate during an emergency. But are we ensuring that safety and efficacy standards are being upheld?” she asks.

So far, remdesivir, a repurposed drug developed during the 2014 Ebola outbreak in Africa, has shown effective results when used in the early stages of COVID-19 infection. However, the drug requires intravenous administration only in hospitals. Irrational use of the drug during the second wave of the pandemic in India in fact resulted in increased hospitalisations. It is only now that Gilead is testing an oral version of remdesivir.

Menghaney says the world spent too much time on repurposing medication, which should have been spent on developing COVID-19-specific antivirals.

**US, AUSTRALIA AND EUROPE HAVE BEGUN FOCUSING MORE ON THERAPEUTICS AS THEY IDENTIFY BREAKTHROUGH INFECTIONS. INDIA IS YET TO FOLLOW SUIT**

This not only created confusion during the initial stages of the pandemic, but also resulted in a lack of interest in developing new drugs.

Another such popular therapy is of monoclonal antibodies. These are laboratory-engineered antibodies administered as injectables in very early stages of infection. One such therapy is Tocilizumab, an immunosuppressant used in treatment of rheumatoid arthritis. "It is prescribed in combination with steroids, but is expensive," says Menghaney. One vial costs ₹40,000. Moreover, the monoclonal antibodies currently used in the country to treat COVID-19 show reduced efficacy against Omicron. Research on several others is going on in at least 11 centres across India, at various stages.

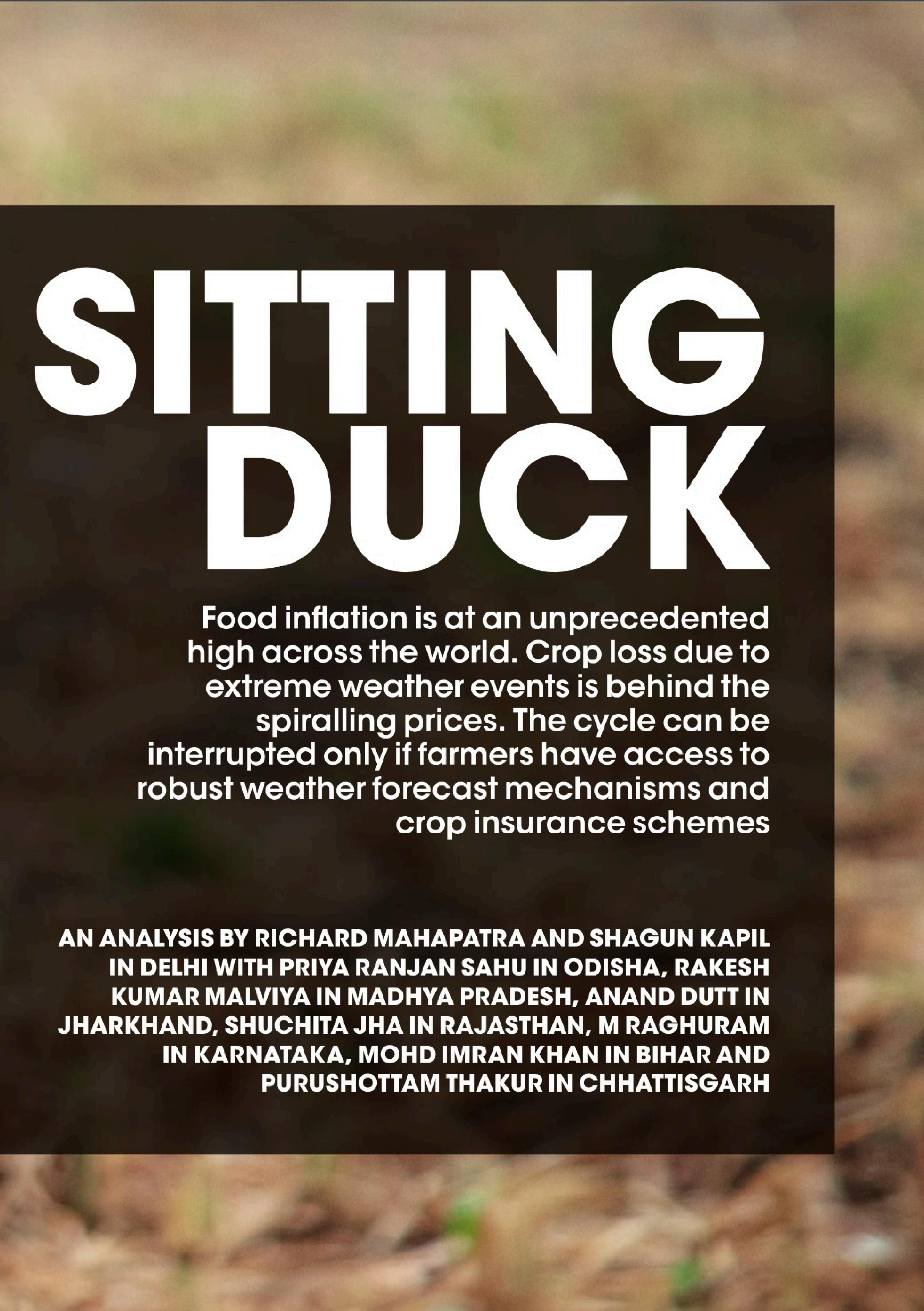
## NOT QUITE ADEQUATE

“The focus on therapeutics is still not at par with vaccines and diagnostics. We needed a holistic approach from the beginning, and still do,” says Ramachandran. As per the latest update of the Access to COVID-19 Tools Accelerator (ACT-A), a WHO-led initiative that focuses on new COVID-19 diagnostics, therapeutics and vaccines, only US $0.06 billion has been donated towards therapeutics between October 29, 2021 and January 7, 2022. As per ACT-A's funding requirements from October 2021 to September 2022, of the $23.4 billion needed, only $3.5 billion is dedicated to therapeutics. In comparison, vaccines and diagnostics are allotted $7 billion each, while health systems need $5.9 billion.

Shrivastav says the US, Australia and some European countries have begun focusing more on therapeutics as they identify breakthrough infections. India, which had marked more than ₹3,300 crore for vaccine development and also acted promptly towards it, has still not shifted focus.

Besides, one must remember that timing is critical in case of therapeutics. Molnupiravir and Paxlovid work only if taken immediately after the onset of the symptoms—ideally, within three to five days. People cannot benefit from these if they do not have ready access to affordable and accurate testing kits.

@down2earthindia



# SITTING DUCK

Food inflation is at an unprecedented high across the world. Crop loss due to extreme weather events is behind the spiralling prices. The cycle can be interrupted only if farmers have access to robust weather forecast mechanisms and crop insurance schemes

AN ANALYSIS BY RICHARD MAHAPATRA AND SHAGUN KAPIL IN DELHI WITH PRIYA RANJAN SAHU IN ODISHA, RAKESH KUMAR MALVIYA IN MADHYA PRADESH, ANAND DUTT IN JHARKHAND, SHUCHITA JHA IN RAJASTHAN, M RAGHURAM IN KARNATAKA, MOHD IMRAN KHAN IN BIHAR AND PURUSHOTTAM THAKUR IN CHHATTISGARH

AT 14. 23 per cent, India's wholesale inflation rate in November 2021 was the highest in three decades. It did reduce marginally to 13.56 per cent the next month, as per data released on January 14, 2022, but even this number is bad news for the government given that five states, including the politically significant Uttar Pradesh, are about to vote in the coming months. Wholesale price index (WPI) inflation is always a cause of concern since it can lead to a higher retail inflation. What's worse, the price rise has been continuous, with December 2021 being the ninth consecutive month to see WPI rise in double digits. Experts predict that the situation would remain the same till the end of the financial year in March.

The high December inflation rate was unexpected because the government had reduced taxes on fuels—a major add-on to overall inflation. So, why is the inflation so high? As it emerges, food inflation, particularly the rise in prices of vegetables and a few foodgrains, has been a driver of this episode of overall inflation. India's wholesale price inflation peaked in November 2021 due to a surge in primary food inflation that hit a 13-month high. In many states, prices of seasonal vegetables are seeing an unprecedented rise. The answer to this is crop loss due to extreme weather events, and the trend is not limited to India.

Food inflation is rising across the world. On January 7, the Food and Agricultural Organization's (FAO's) Food Price Index showed that food prices had reached a decade high, with an average rise of 28 per cent over the previous year. Adjusting for inflation, the average food prices in the 11 months of 2021 are the highest in 46 years, says FAO. The current situation is being compared to the rise in food prices in 2011, which had led to riots across Asia, especially west Asia and Africa, leading to anti-government protests, popularly known as the Arab Spring, and regime changes. Abdolreza Abbassian, senior economist with FAO, attributes the current food price rise primarily to climatic conditions. "While normally high prices are expected to give way to increased production, the high cost of inputs, ongoing global pandemic and ever more uncertain climatic conditions leave little room for optimism about a return to more stable market conditions even in 2022," says Abbassian.

Between 1956 and 2010, there were nine double-digit inflation episodes. Of these, seven were caused by drought conditions, as per the Reserve Bank of India (RBI). In the past six decades, there have been three major episodes of significantly high food prices globally: 1970s, 2007-08 and 2010-14. All these were triggered by weather shocks followed by factors such as increase in oil prices, trade policy interventions and biofuel consumption. The current episode seems to be entirely driven by weather anomalies.

^
Food inflation is rising across the world primarily driven by weather anomalies

A similar situation caused the last high-price episode in 2019-2020. Rising prices of food items, particularly of vegetables, caused retail inflation to rise to a 68-month high of 7.59 per cent in January 2020. While the inflation figure captured headlines, a crucial analysis of the reasons behind this sustained increase in food prices slipped public attention. Extreme weather events had damaged crops, leading to a collapse of the supply of vegetables at a time of the year when they usually flood the markets. On the basis of year-on-year comparison, vegetable prices had gone up by 50.19 per cent since January 2019. They increased by 45.56 per cent in rural areas and markets during this period and by 59.31 per cent in urban areas. Of the six categories of consumption items used in tabulating the overall inflation figure, food and beverages recorded the highest price rise, thus increasing the overall inflation rate. In 2014, when inflation was an emotive political agenda, RBI pointed out: “One of the traditional explanations for rising food prices has been the supply-side shocks related to weather either because of droughts or floods.”

The current global food inflation is driven predominantly by wheat, which reported price rise due to drought and high temperature in major producing countries. In 2021, as various trade reports show, spring wheat production declined by 40 per cent in the US. Russia, the world’s largest exporter of wheat, also harvested less and has now imposed a tax on wheat export to ensure ample stock for domestic consumption. Unusual frosts in Brazil’s coffee bean producing areas in July 2021 have led to a production dip of up to 10 per cent. According to the forecast of the International Coffee Organization, the climatic onslaught on the world’s top coffee producer would lead to price rise for the next two years.

“But something that deserves attention is the number of times since the year 2000 ‘unpredictable’ and ‘unfavourable weather’ has been reported by FAO to have caused ‘reduced harvest expectations’, ‘weather-stricken harvests’ and ‘production decrease’,” writes Alastair Smith, Senior Teaching Fellow in global sustainable development at University of Warwick, UK, on *The Conversation* in September 2021. He analysed FAO’s inflation-adjusted Food Price Index and found real global food prices were higher than in 2011, when food riots contributed to the overthrow of governments in Libya and Egypt. Based on real prices, it is harder to buy food on the international market than in almost every other year since UN record keeping began in 1961. The only exceptions are 1974 and 1975, he writes.

Non-profit Oxfam has simulated the impact of adverse climatic conditions on food price. Its estimates in 2012 show the average world market export price for wheat would rise by 120 per cent by 2030 compared with 2010; the figures for processed rice is 107 per cent and for maize is 177 per cent. The fact is by changing the rain and its distribution, climate change is altering the very axis of agriculture.

# DOMINO EFFECT

## The link between extreme weather events, reduced agricultural production and food inflation is clearer than ever

"40,000 CABBAGE saplings, 15,000 cauliflowers, all lost!" says Ramesh Kumar Singh, a farmer of Mandar village in Jharkhand's Ranchi district. On January 12, a severe hailstorm battered Mandar and other villages in at least nine districts right when the crops were ready for harvest. It was so severe that the village seemed to be under a few centimetres of snow. "My earning from this crop is gone, so is my investment," Singh says.

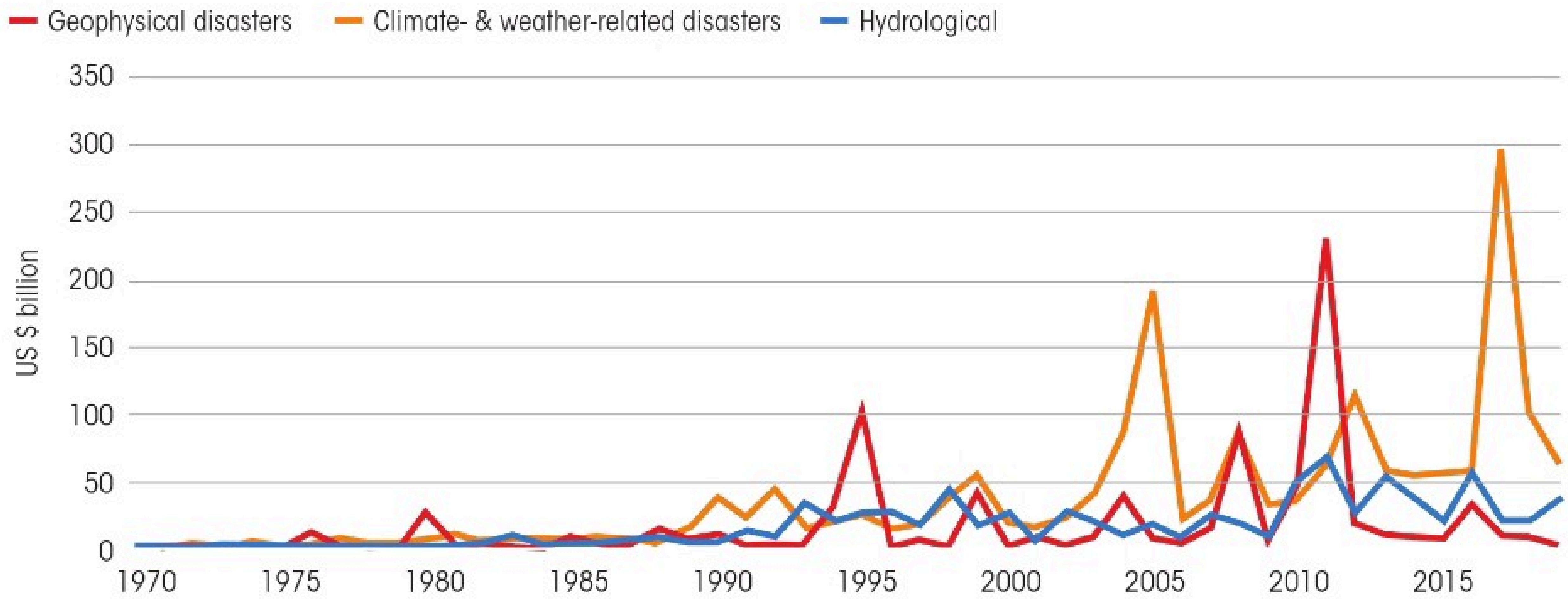
Following heavy downpour in September last year—the wettest September for India in 27 years—farmers in this region had got back to farms in October with fresh sowing, but unseasonal rains in November-December damaged the crops. Many like Singh, who grew vegetables in a last-ditch effort to earn this season, saw their hopes dashed with the January hailstorm.

In neighbouring Madhya Pradesh, farmers of Niwari district also rue complete loss of their standing rabi crops due to a hailstorm on January 9. It hit at 8 am and continued for 30 minutes, flattening wheat, peas, mustard, sorghum and other crops in at least a dozen villages. "The hails weighed 10-50 g and did not melt until evening. I have never seen such a hailstorm," says Sanjeev Prajapati, a farmer from Kalothra village. It has rained in all but nine of the state's 52 districts since December 25.

Extreme weather events have devastated farmers in the country in recent years.

## INCREASINGLY VULNERABLE

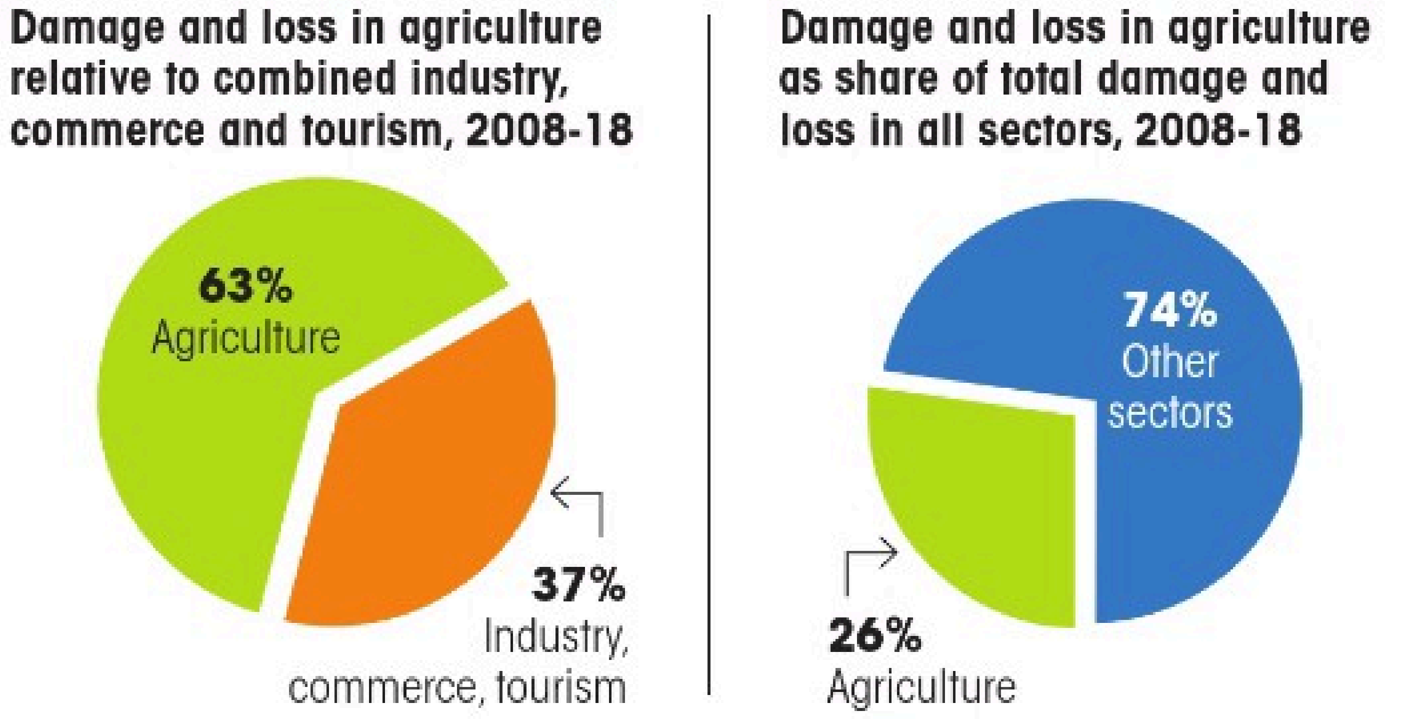
Global economic loss from disasters has been consistently rising



Source: "The impact of disasters and crises on agriculture and food security: 2021" by FAO

## HEIGHTENED THREAT

Given its reliance on weather, agriculture is especially vulnerable to the increased frequency/intensity of extreme weather events


**Damage and loss in agriculture relative to combined industry, commerce and tourism, 2008-18**

**Damage and loss in agriculture as share of total damage and loss in all sectors, 2008-18**

Source: "The impact of disasters and crises on agriculture and food security: 2021" by FAO

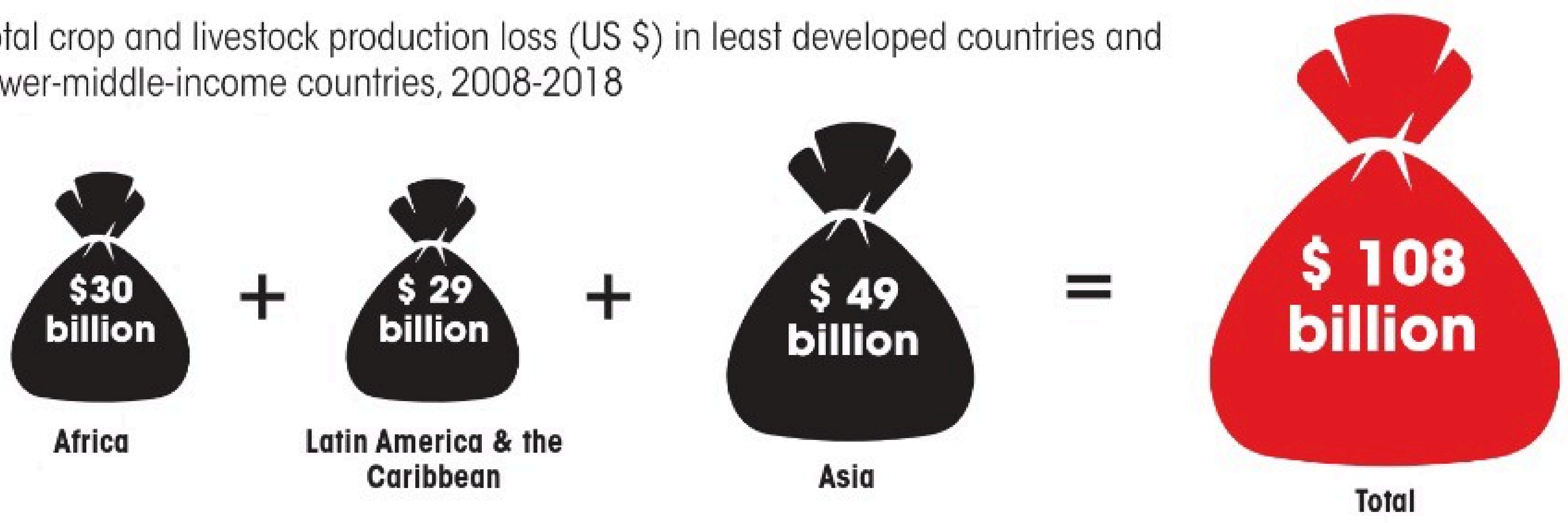
It was particularly severe in 2021. Overall, India lost 5.04 million hectares (mha) of crop area to cyclonic storms, flash floods, landslides and cloudbursts till November 25, 2021, Narendra Singh Tomar, Union minister of agriculture and farmers' welfare, told the Lok Sabha on November 30, 2021. A *Down To Earth* (DTE) analysis shows some 45 hailstorm events hit over 80 districts in 12 states from December 2021 to January 15, 2022. Before this, heavy rainfall battered these states when kharif crops were being harvested, were ready to be sold, and fields were ready with cash crops like vegetables.

Nuapada, one of India's poorest districts in Odisha, received five times more rainfall than normal in January this year. It has literally wiped out the farmers' year-worth of investment as thousands of hectares of rabi crops like green gram, potato, red lentil, Bengal gram, lima beans and onion have been inundated. Kedar Sabar, a small tribal farmer of Bendrabahal village had grown *gol chana* (round pea) in his 1.2 ha. It is sown in lowland just a few days before harvesting paddy. "When the *chana* saplings get trampled under foot during the cutting of paddy, they grow vigorously, and start flowering as the soil dries out," says Sabar. Now the flowers are dropping because of untimely rains. "But for the rain, I would have got *dal* and onion for my consumption and a net income of ₹35,000," he says.

The rain has also affected those waiting to sell their produce. Asish Padhi of Budhikomna village in Nuapada owns 5 ha of fertile farmland. "I took 6 tonnes of paddy to the *mandi* on December 18. As the millers did not turn up, my stock was not procured and the paddy was lying in the open. It got drenched in the rains on January 11-12. The agents are asking me to sell the stock at ₹1,200 per quintal (1 quintal equals 0.1

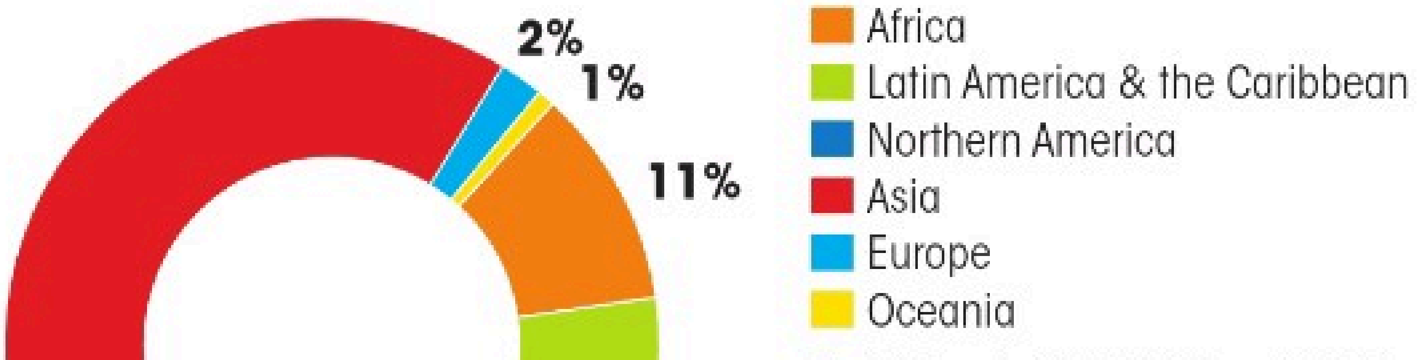
## SCALE OF LOSS

Total crop and livestock production loss (US $) in least developed countries and lower-middle-income countries, 2008-2018



## IMPACT AREAS

Regional distribution of crop and livestock production loss, 2008-18



The total loss is US $280 billion, with 39% (US $108.5 billion)–concentrated in the least developed countries and lower-middle-income-countries. Asia accounts for around 74% of all crop and livestock production loss (US $207 billion). A particular case in point is China, where disasters have cost over US $153 billion in 2008–2018, constituting 55% of global agricultural loss

Source: "The impact of disasters and crises on agriculture and food security: 2021" by FAO

tonne), ₹760 less than the minimum support price offered by the government," says Padhi. "About 5,000 tonnes of paddy of over 1,000 farmers were stacked in the open across Nuapada. They all would have faced losses because of the rains," says Sanjay Tiwari, a farmer from Bendrabhai village.

As news of hailstorms and unusual extreme rainfall spread, albeit as brief local weather stories, consumers across the country felt the pinch. In Ranchi, the prices of seasonal vegetables like cauliflower and tomato are skyrocketed to above ₹30 per kg. In a normal year, these vegetables are priced at ₹5-10 per kg. In fact, all the 25 markets surveyed by DTE reported unusually high prices of vegetables, wheat and paddy.

### WORST-IMPACTED

Agriculture is by far the worst-impacted sector from extreme weather events and disasters, which have significantly increased in the past two decades (see 'Increasingly vulnerable', *p*33). Only 100 disasters struck a year in the 1970s, as per the Food and Agriculture Organization (FAO); their frequency increased to 360 in the 2000s and to 440 in the 2010s. Least developed countries (LDCs) and low- and middle-income countries (LMICs) bore the brunt; in 2008-18, these countries lost $108.5 billion (₹8.2 lakh crore) due to disaster-induced decline in crop and livestock production, as per FAO. (see 'Scale of loss', 'Impact areas').

In India, no comprehensive data is available on the monetary loss due to disaster-induced crop damage. However, data aggregated from government replies in Parliament on crop loss and damage in recent years shows that 36 million ha of farm land have been affected due to hydro-meteorological calamities, including heavy rain and floods since 2016—6.65 mha in 2016, 5.08 mha in 2017, 1.70 mha in 2018, 11.42 mha in 2019, 6.65 mha in 2020 and 5.04 mha in 2021.

The Union government on September 17, 2020 told the Lok Sabha that in 2016, damage to crops on 6.65 mha was estimated to be to the tune of ₹4,052.72 crore. If this is applied to the 36 mha of crop area India has lost since 2016, the figure translates to a whopping ₹29,939 crore loss for the farmers. However, this would only be an indicative figure. In 2017, while the area of crop damage was lower compared to 2016, the value of the damage was more than double—₹8,761.39 crore.

Shifting rainfall and variability in precipitation particularly poses a risk to the rainfed agriculture that is crucial for the survival of a significant number of poor population and plays a critical role in global food production. Recently, Miles Parker, senior lead economist at the European Central Bank (ECB) and Livio Stracca, deputy director general, ECB, studied the impacts of weather, particularly seasonal divergence of temperature, on prices in 48 advanced and emerging countries. They have found that "during a hot summer, food prices increase by 0.38 percentage point contemporaneously." Swiss Re, reinsurance company based in Zurich, estimates that rising temperatures will cause a dip in agricultural production. "Higher temperatures and more extreme drought events could severely reduce labour productivity as a result of heat stress and health effects," it says in a statement in April 2021.

**AGRICULTURE IS BY FAR THE WORST-IMPACTED SECTOR FROM EXTREME WEATHER EVENTS. IT ABSORBS A HUGE 63 PER CENT OF THE IMPACT FROM DISASTERS, WHICH HAVE SEEN A MAJOR RISE IN THE FIRST TWO DECADES OF THIS CENTURY**

## CLIMATE'S FOOD TRAP

The world is already losing up to 4 per cent of potential crop and livestock production due to disasters, says FAO. This converts to a loss of 6.9 trillion kilocalories per year, or annual calorie intake of 7 million adults. If one interprets this loss in context of poor-, lower- and middle-income countries, it is a loss of 22 per cent calorie intake daily. So, Climate change-induced disasters not only impact the farmers in terms of income loss, but also reduce availability of food. Loss in production increases prices which, in turn, influences people's food intake. It is the climate's food trap that captures every one.

A survey by the Asian Development Bank (ADB) conducted during 2001-10 in 63 countries showed that 1 per cent increase in food inflation leads to an increase of 0.3 per cent in both infant and child mortalities, and 0.5 per cent in undernourishment. The impacts are severe in poorer countries.

Given that an average household in India spends nearly 50 per cent of its earnings on food—the poor spend more than 60 per cent—price rise will precipitate the worst crisis in the country. The poor will face a double whammy: one, they will be forced to spend much more on food, and, two, their health will further deteriorate. India's poverty level may increase sharply and the country may not succeed in its fight against infant and child mortality and malnutrition.

Interestingly, the ADB survey also shows that impacts of food inflation on public health are lesser in countries that have a higher contribution of agriculture to GDP. This calls for smart measures that can help agriculture adapt to the new normal.

The first step is to re-orient cropping patterns based on agrometeorology advisories. A survey by the National Council of Applied Economic Research (NCAER) has shown timely delivery of weather advisories to farmers had a significant impact on their income. The survey was done to gauge the economic impact of India's investments on the National Monsoon Mission (NMM) and High Performance Computing Facilities (HPC). Farmers were asked to make modifications to nine critical farming practices based on the weather advisories. Going by NCEAR estimates, the average annual income of a farming household that did not adopt any changes was ₹1.98 lakh. But for a farmer that took up 1-4 modifications, this income increased to ₹2.43 lakh. With five to eight modification, farmers' income rose to ₹2.45 lakh per annum. Those who adopted all the nine changes had an income of ₹3.02 lakh per annum. "The economic investment of ₹1 rupee in NMM and HPC facilities realises a 50-fold increase in economic benefits through gains to BPL farming and fishing families," the report said.

Despite such measures, sudden weather events, such as a cyclonic storm, sudden downpour or raging heatwave, which are becoming frequent and unpredictable, may still wreak havoc on agriculture plans. Here insurance can offer cushion against the damage and help farmer prepare for the next crop—only if the policies are robust.

# FACADE OF INSURANCE

Since its launch in 2016, India's flagship crop insurance scheme has seen a consistent fall in acreage and number of farmers covered

"EVEN IF a single farmer's crop is damaged in a village he will get the benefits of insurance," Prime Minister Narendra Modi had said while launching the government's flagship Pradhan Mantri Fasal Bima Yojana (PMFBY) from Madhya Pradesh in 2016. The words, however, mean nothing to the farmers of the state's Harda district whose standing crops got destroyed by a severe hailstorm on January 9, 2021.

The state's agriculture minister Kamal Patel, who belongs to Harda constituency, reached the district on January 10 to survey the crop loss. Chief Minister Shivraj Singh Chouhan also directed officials to ensure that the damage survey is done effectively and every report be read out in front of the farmers in the panchayat. But Mahesh Jageshwar Ramkuche, a small farmer from Pantalai village, has no hopes of compensation though he has lost the entire *chana* (chickpea) crop on his 1.27 ha farm. In 2019, when his soybean crop got destroyed due to heavy rains, Ramkuche received only ₹2 in the name of insurance claim. "A similar survey was conducted at that time for assessing crop loss," he says, adding that he has regularly paid the premium for PMFBY for the past six years. Though Ramkuche does not remember the exact premium amount, he says ₹10,000-12,000 gets deducted from his Kisan Credit Card (KCC) account every year towards PMFBY premium and for the interest on agricultural loan he

PHOTOGRAPH COURTESY: MAHENDAR YADAV

**THOUGH I HAVE APPLIED FOR COMPENSATION UNDER BIHAR FASAL SAHAYATA YOJANA THIS RABI SEASON, I AM STILL WAITING FOR COMPENSATION FOR MY LOSSES DURING THE 2021 KHARIF SEASON**

**BABLU RAI FROM SUPAUL DISTRICT, BIHAR**

has taken from the bank.

The scheme was initially compulsory for loanee farmers but has been made voluntary for all since 2020. It insures farmers against all non-preventable natural risks from pre-sowing to post-harvest. It is a yield index-based scheme and mainly implemented on area approach basis. Claims are worked out on the basis of shortfall in actual yield vis-à-vis the threshold yield in the notified area. The premium is, however, determined through bidding. Farmers have to pay a maximum 2 per cent of the total premium of the insured amount for kharif and 1.5 per cent for rabi food crops and oilseed and 5 per cent for commercial/horticultural crops. The balance of actuarial/bidded premium is shared by the Union and state governments on 50:50 basis, and on 90:10 basis in case of northeastern states. At the start of each season, the state government notifies the threshold yield of individual crops in each insurance unit, calculated based on the average yield of past seven years. The notification also mention the sum insured for individual crops in insurance units.

Despite the severity of crop loss due to extreme weather events increasing in recent years, the number of farmers opting for crop insurance has been declining. An analysis of data compiled from PMFBY's dashboard and from government replies in Parliament shows that since 2016, there has been a 62 per cent decrease in farmers covered under crop insurance during kharif season to 15.1 million in 2021, and 46 per cent decrease during rabi to 9.2 million in 2021. Area insured has also reduced—57 per cent under kharif and 22 per cent under rabi. While there has been a decrease in applications from non-loanee farmers, for whom PMFBY was optional from the start, many loanee farmers tell *Down To Earth* (DTE) that they pay the premium as they are not aware the scheme was no longer mandatory.

To understand how the scheme helped farmers cope extreme weather events, DTE reported from eight states that have faced extensive crop damage during the kharif and rabi seasons in the current agricultural year. Their bitter experiences highlight the many flaws in the scheme.

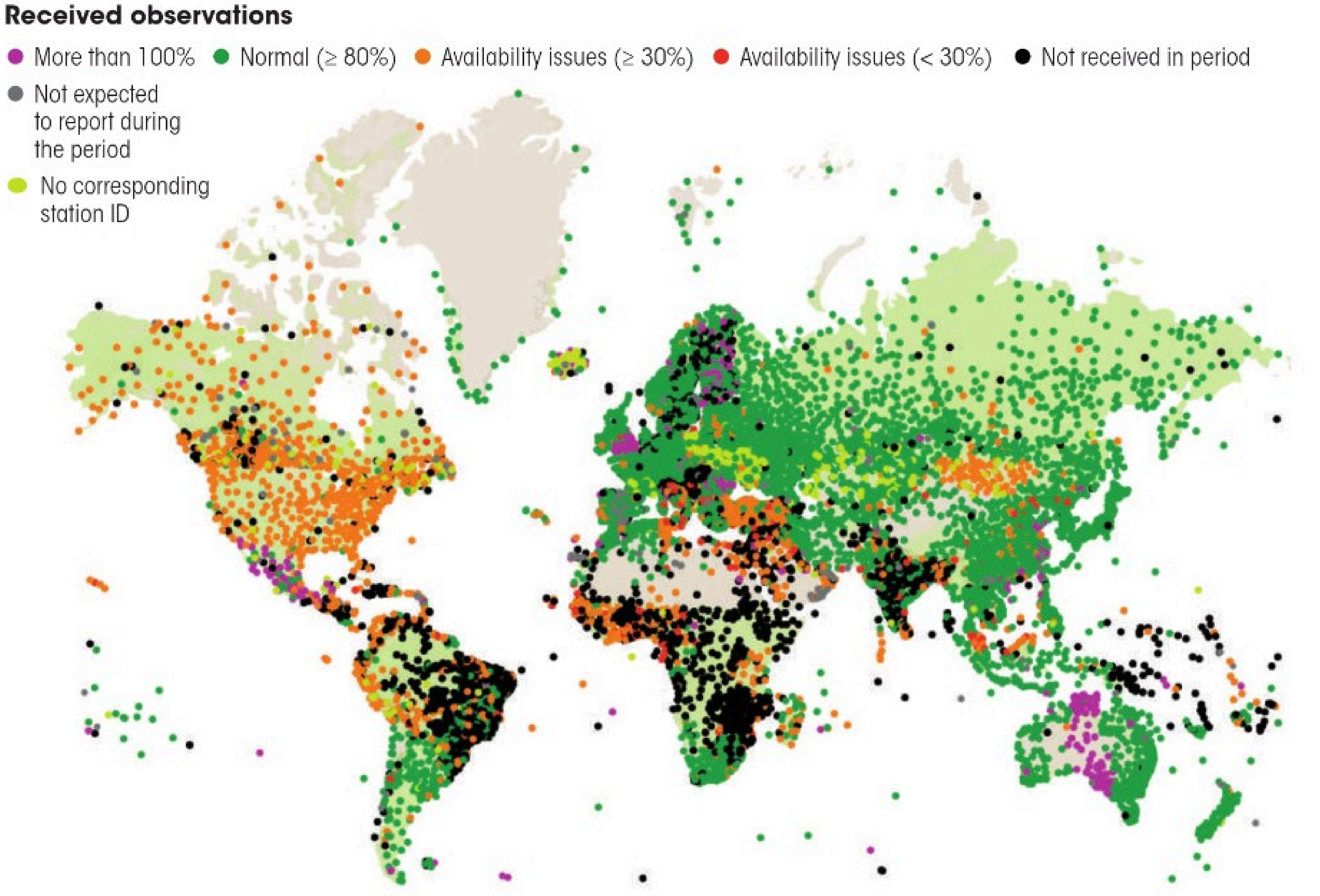
**WE HAVE BROUGHT NEW FARMING PRACTICES LIKE INTERCROPPING TO MALAVALLI TALUK. BUT WHEN IT COMES TO HELP FROM INSURANCE COMPANIES AND THE LOCAL AGRICULTURE DEPARTMENT, IT IS VERY DIFFICULT TO GET RELIEF**

**VENKATESH AND DHARMAPPA FROM MALAVALLI TALUK IN MANDYA DISTRICT, KARNATAKA**

PHOTOGRAPH COURTESY: MANDYA AGRICULTURE DEPARTMENT

# FORECAST GAPS

Parts of Africa, Asia and South America lack infrastructure to provide enough observational data for surface-based meteorological observations to support high quality forecasting


Received observations
● More than 100%
● Normal (≥ 80%)
● Availability issues (≥ 30%)
● Availability issues (< 30%)
● Not received in period
● Not expected to report during the period
● No corresponding station ID

Source: WMO's WIGOS Data Quality Monitoring System as of January 17, 2022

## COMPENSATION LOW OR NEVER

Some complain that crop loss surveyors of the insurance company while computing the claim do not base it on the market price of the product but on the cultivation cost. "In 2020 my crop was lost due to the floods in the Hemavati river and cultivation was not possible in 2021 due to siltation. Both years I lost my income, but my return from insurance was only 30 per cent which is equal to the insurance premium I paid. What's the use of insuring," asks Bharamappa, a farmer from Udupi district, Karnataka, which saw 60 per cent excess rainfall in 2021.

Hathi Singh, a farmer from Rajasthan's Jaisalmer district laughs at the absurdity of the way the scheme functions. He and his brother Ghenwar Singh have 70 ha and 15 ha adjacent agricultural lands in Bhimsar village. Yet when a hailstorm in March 2020 damaged harvest-ready chickpea, mustard, cumin and psyllium husk (*isabgol*) crops in both their fields, only Ghenwar Singh could avail insurance claim under PMFBY. Two years later, Hathi Singh, who is also the district president of Bharatiya Janata Party Kisan Morcha, is still waiting for his money. "Since 2016, I have been paying ₹14,000 every year as premium. Does it make sense that both our crops failed on adjacent lands but one of us got the claim and the other did not," a perplexed Hathi Singh asks.

Rajasthan is one of the few states where the number of farmers under PMFBY has

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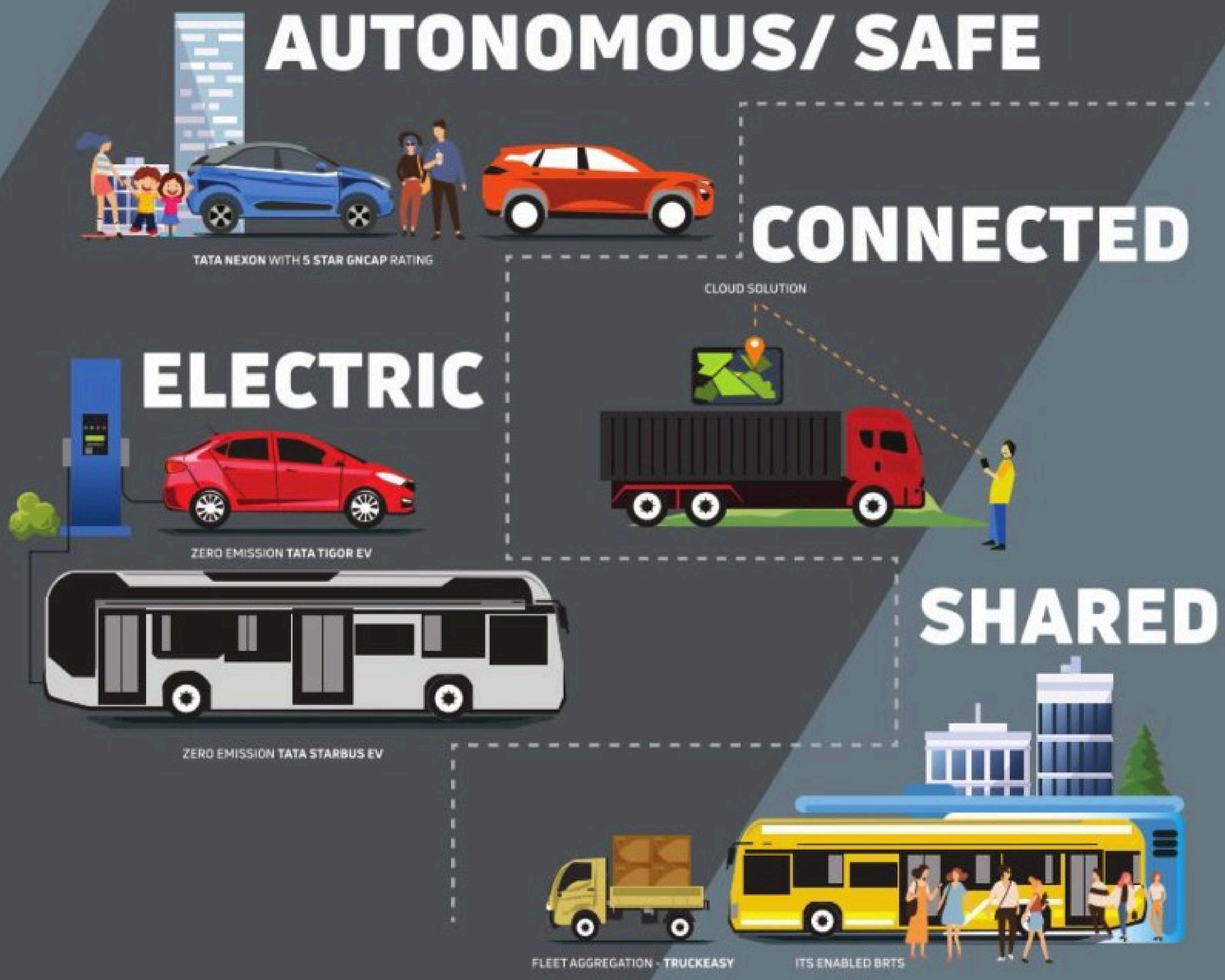
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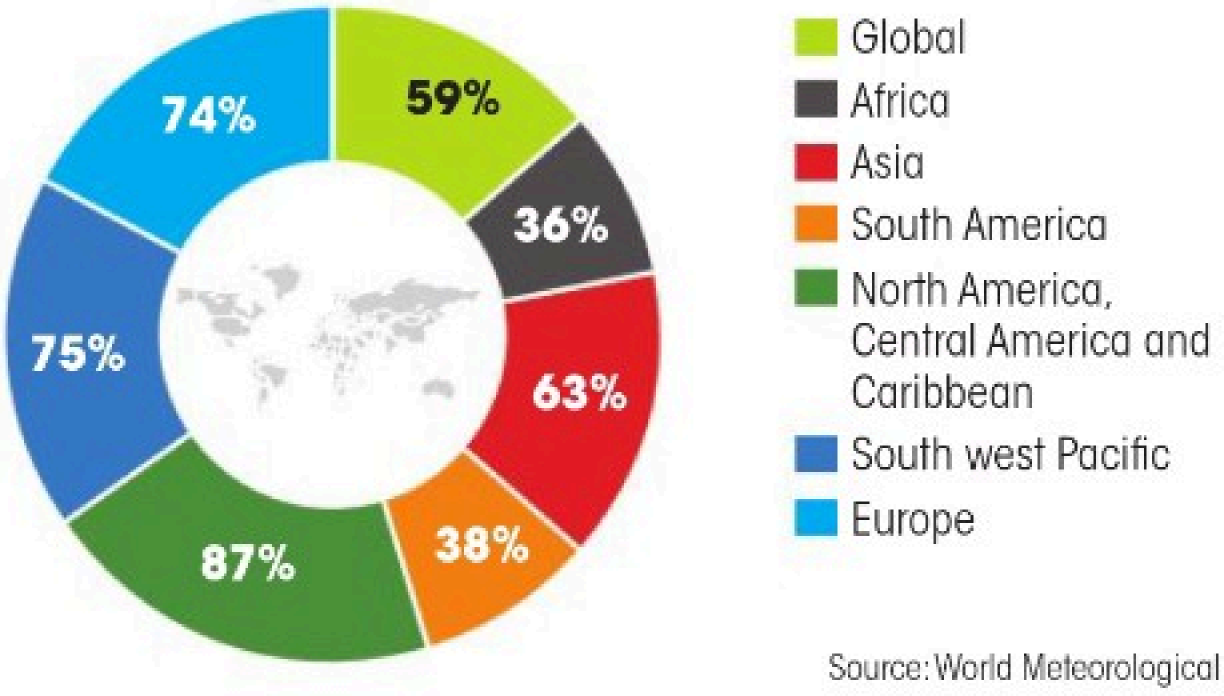
## PREDICTION CAPACITY

Percentage of World Meteorological Organization members that reported having a multi-hazard early warning system



Source: World Meteorological Organization

been increasing—from around 2 million in 2018 to 3 million in 2021 in kharif. However, they are also increasingly getting irritated. Shivdan Singh Bhati, a farmer leader from Moolana village, Jaisalmer, says the number of farmers opting out of crop insurance has also increased in Rajasthan, since the insurance companies do not clear the claims. “I had sown mustard and cumin on 12 ha, spending ₹1.2 lakh, but everything was ruined because of hail. I pay a yearly premium of ₹10,000 for each crop and was supposed to get around ₹4 lakh as my coverage, but the insurance company did not provide the claim,” Bhati says.

An amount of over ₹3,372 crore is pending in claims worth ₹66,460 crore in the last three years under PMFBY, as of November 25, 2021, and “state subsidy pending” is one of the major reasons, as per a reply by Union agriculture minister Narendra Singh Tomar in the Lok Sabha on November 30, 2021. Of the ₹3,372 crore, ₹1,087.35 crore is pending for financial year 2020-21.

### STATES SAY PREMIUM TOO HIGH

However, Bhati and Hathi Singh both say that the response they get from the insurance companies is that the state government has not paid its part of the share in the scheme and that is why the claims cannot be settled. This seems to be true. A whopping ₹4,744 crore is pending from states—₹321.96 crore from 2018-19, ₹1558.28 crore from 2019-20, and ₹2,863.79 crore from 2020-21. If the states do not pay their premium share on time, the insurance process cannot be initiated as the Centre pays its share only after states have paid.

The inclination of states in the scheme, which started with the participation of 27 states, is on the wane. Seven states—Andhra Pradesh, Jharkhand, Telangana Bihar, Gujarat, Punjab, and West Bengal—all predominantly agriculture states, have discontinued the scheme. Some of these states have their own insurance schemes. Of the rest 29 states and Union Territories, only 19 have participated in the ongoing rabi 2021 season.

One of the major reasons for states opting out or delaying paying their share of premium is financial constraints. The premium rates have increased from 11.6 per cent in kharif 2015 to 12.5 per cent currently. For many states, paying the premium subsidy is a huge cost. For example, the total PMFBY premium subsidy to be paid by Rajasthan in 2020-21 was ₹2,822.7 crore, which formed 25 per cent of the state's agriculture budget that year.

### ASSESSMENT CRUCIAL

Disappointed with the scheme, Ranjan Barik of Babebira village from Bargarh, Odisha's most important agrarian district, has opted out of PMFBY this year. Barik says initially they were getting compensation based on the joint crop cutting experiments (CCEs) by officials of the state agriculture department, revenue department and representatives of the insurance company. But from 2019, the private insurers are not following the assessment by the government officials and rejecting many claims on the basis of their own assessment.

CCEs are conducted just before harvest to assess crop loss by estimating average yield for all notified crops in the notified insurance units, and insurance companies are bound to settle the claims within two weeks of receiving the yield data. In the case of mid-season adversities, the loss assessment should be carried out within seven days

**I CLOSED MY PMFBY ACCOUNT IN LAST DECEMBER. I COULD NEVER UNDERSTAND HOW THEY CALCULATE. DIESEL, FERTILISER AND SEEDS ARE ALL GETTING EXPENSIVE. CROP INSURANCE NEVER REFLECTS THIS CULTIVATION COST WE INCUR**

**MAKHANLAL TYAGI FROM RASULIYA PARIHAR VILLAGE IN SEHORE DISTRICT, MADHYA PRADESH**

PHOTOGRAPH: RAKESH KUMAR MALVIYA

from the occurrence of the event and the payment made within 30 days. In a localised event, the insured farmer has to intimate the insurance company within 72 hours, following which assessment of the affected area will be done in 10 days and the payment made within 15 days of the preparation of the loss assessment report.

The success of PMFBY depends on the accuracy of loss assessment, in this case, the CCEs. Ideally under CCE, a team, consisting of government officials and the local insurance company, selects random fields in an insurance unit (the states notify village/village panchayat/mandal/taluka/district as an insurance unit). The team then identifies a small portion of the field and the crop in that area is harvested to ascertain the yield of that season. Depending on their assessment, all farmers enrolled under the scheme in the insurance unit will either get the compensation or not. The minimum sample size for randomly selected plots is four in case of a village/village panchayat, 10 in case of a mandal, 16 in case of taluka or block, and 24 in case of a district. The average yield of a notified crop in an insurance unit will be the average yield of the best five years out of the last seven years. Farmers in Bargarh say that earlier agriculture department officials would inform them days before the CCEs, and they used to be present during the exercise. But now private companies do the assessment without informing the farmers. Agriculture department officials agree with the farmers. “Claiming that they assess the crop damage from satellite, they take unilateral decisions and reject the claims. As a result, farmers have lost their trust in the insurers,” says an official requesting anonymity.

## CORRUPTION, DISPUTE

Far away in Uttar Pradesh’s Jalaun district, farmers complain of corruption. Kamlesh, a farmer from Amkhera village, has paid ₹7,200 in PMFBY premium annually since 2017. A hail in February 2020 damaged his and other farmers’ peas crop and CCEs were conducted in the village thereafter. “Almost 500 farmers lost their crop that year but in the survey only 50-60 people got their claims. The lekhpal (patwari or government official at block level) takes bribe from farmers for assessing the damage. Those who pay, get their names included," he says. The number of farmers opting for the scheme has been falling gradually every year in Uttar Pradesh—from 2.8 million in 2018 to 1.79 million in 2021.

## DISPUTES OVER YIELD QUALITY

CCE, as a method for estimating crop damage, has been criticised since the beginning for its unreliability in giving an accurate assessment. The 2020 revamped operational guidelines of the scheme also said that "Disputes on the quality of yield data is a challenge in the effective implementation of the scheme" and mandated that the CCE process must be digitised, including geo-coding (providing the latitude and longitude of the CCE location) and officials must take photographs of the CCE plot and the CCE activity with date/time stamp. However, the new rules have not brought much change. A discussion paper by International Food Policy Research Institute in 2020 says that the implementing agencies at the state level did not act upon it. Several studies have highlighted malpractices in CCEs by farmers, insurance companies and the government. While in some cases, misuse of aerial survey through drones by selection of healthy crop patches by the appointed loss assessor have been reported, in other cases, pressurising the staff conducting CCEs by farmers to document higher losses were recorded.

Rajeev Chaudhary, who has handled crop insurance during his tenure at two public sector undertakings (PSUs)—Agriculture Insurance Company Ltd and United India Insurance Company Ltd—says that loss assessment has not gone as envisaged. "Damage assessment is manual and you can imagine there will be lot of leakages and wrong claims lodged under the patwari system. CCE is an age-old practice. It was designed mainly for estimating yield for planning purposes and not for insurance purposes," he says.

## HUMAN RESOURCE SHORTAGE

Human resource shortage in conducting and observing CCEs is a hurdle that the government has not been able to cross since

**INCESSANT RAINS DAMAGED MY ENTIRE SOYBEAN CROP LAST YEAR, WHICH COULD HAVE EARNED ME ₹36,000. I RECEIVED ONLY ₹10,000 UNDER PMFBY. THIS YEAR, MY WHEAT CROPS HAVE BEEN DAMAGED BY THE HAILSTORM ON JANUARY 9. NO SURVEY HAS BEEN DONE TO ASSESS THE DAMAGE**

BATANLAL MALVI FROM RASULIYA PARIHAR VILLAGE IN SEHORE, MADHYA PRADESH the inception of PMFBY. States also attribute the delay in payments to inadequate human resources. For such a large scheme, CCE requires a dedicated staff since a huge number of CCEs need to be covered within the short harvesting period.

The government is aware of this and is working on shifting to assessment by drones or satellites. "It was expected that by 2021 the government would be able to assess loss of major crops—wheat and paddy through satellite or drones. Work was piloted and 16 remote sensing companies were shortlisted. They had submitted their plans but things have not progressed much," says Chaudhary.

**CROP CUTTING EXPERIMENT, AS A METHOD FOR ESTIMATING CROP DAMAGE, HAS BEEN CRITICISED SINCE THE BEGINNING FOR ITS UNRELIABILITY IN GIVING AN ACCURATE ASSESSMENT**

Meanwhile, PMFBY seems to be a scheme nobody—farmers, states or insurance companies—is happy with. The scheme started with 19 insurance companies—14 private and all five public sector general insurance companies, but only 11 companies have bid for the kharif 2021 season—10 private and one PSU. They say PMFBY has become a loss-making scheme. In 2018-19 and 2019-20, the gross premium amounted to ₹17,220 crore and ₹19,966 crore respectively. Against this, the reported claims were ₹29,341 crore and ₹27,394 crore, meaning a cumulative loss of ₹19,549 crore. "The insurance industry is at an 80-85 per cent loss ratio currently. If we add expenses of the industry like reinsurance cost, marketing and management, the industry is at close to 100 per cent loss ratio. And this is when India has not suffered any huge calamity in last four five years. Local extreme weather events have increased, yes. Few of the states are loss making and in other states that have not made claims frequently, the calamity for when they made, was severe. This means the incidence ratio is low but calamity is high. Hence, we are not seeing much profits and insurers like ICICI, Tata, Cholamandlam, Sriram have opted out," says an industry source.

In the initial years of the scheme, the pattern was reverse—claims paid by insurance companies was less than the gross premium. The problem is aggravated when most of the states which are part of the scheme are loss making.

"Few state governments have opted out of the scheme claiming that they have not received the adequate claims in a particular year, basically meaning that it was a good crop year. For example, Punjab. States say why should they pay subsidy premium under PMFBY when they can manage on their own by giving cash disbursements or through some compensation schemes if required. In the start of 2016 season, many states had come forward but now only those states remain which see continuous claims," the source says.

To its credit, PMFBY is an improvement in terms of less premium for farmers and more types of risk coverage, compared to its predecessor—Modified National Agricultural Insurance Scheme. The government has made changes to the scheme twice, with an aim to make it more efficient. It has recently also set up two separate panels to suggest suitable working models for PMFBY, following the withdrawal of seven states from the scheme.

One of the panels will study the feasibility of adopting various technology-based approaches and use of drones in crop yield estimation and the other committee will conduct a cost-benefit analysis of different insurance models, especially the cup and cap model, now also known as the Beed model. In Beed, the insurance company provides a cover of 110 per cent of the gross premium and if the claims exceeds the cover, the state government would pay the bridge amount. If the claims are less than the premium collected, the insurance company would keep 20 per cent of the amount as handling charges and reimburse the rest to the state government.

Their success of these models, if and when implemented, will be decided only after the next disaster, which, chancer are, will not be too far off.

@down2earthindia

*(With inputs from Ajit Panda and Swadhin Meher in Nuapada and Sonepur, Odisha)*

PHOTOGRAPH: RAKESH KUMAR MALVIYA

# An unusual contest

## Rajasthan's state bird, the great Indian bustard, might lose its last natural habitat to wind and solar power plants

### **SHUCHITA JHA ,** SANWATA, JAISALMER

IT IS a January afternoon, but it feels like peak summer. A mild breeze makes up for the shards of winter, caressing the face as the eyes narrow under the glare of the sun. Birds chirp in the trees, and as far as the eye can see, there is nothing but a few hundred camels happily grazing away on the thorny bushes in the Degrai *oran*, a sacred grove, in Jaisalmer, Rajasthan. The windmills, visible at a distance, tower over everything else in the vicinity.

"This is the largest and one of the last *oran*s in the area," says Masinga Ram, a camel handler from Sanwata village, adjoining the *oran*. For centuries, the trees in the *oran*, spread over 60,000 *bighas* (approximately 100 sq km), have remained untouched by the people in the villages. "It is more than 600 years old and was declared a protected area by ruler Vikramdev in the 15th century. Felling of trees is forbidden in the area. We just collect the dead branches on the ground and pluck ripened fruits for ourselves, the rest is all for the animals and birds," says Shivdan Singh Bhati, a farmer and a member of the Degrai Mata Trust, which looks after the temple inside the *oran*. It is in the middle of a 13,000 sq km wide biodiversity-rich land that is among the last natural habitats of Rajasthan's state bird, the great Indian bustard (GIB), listed un-

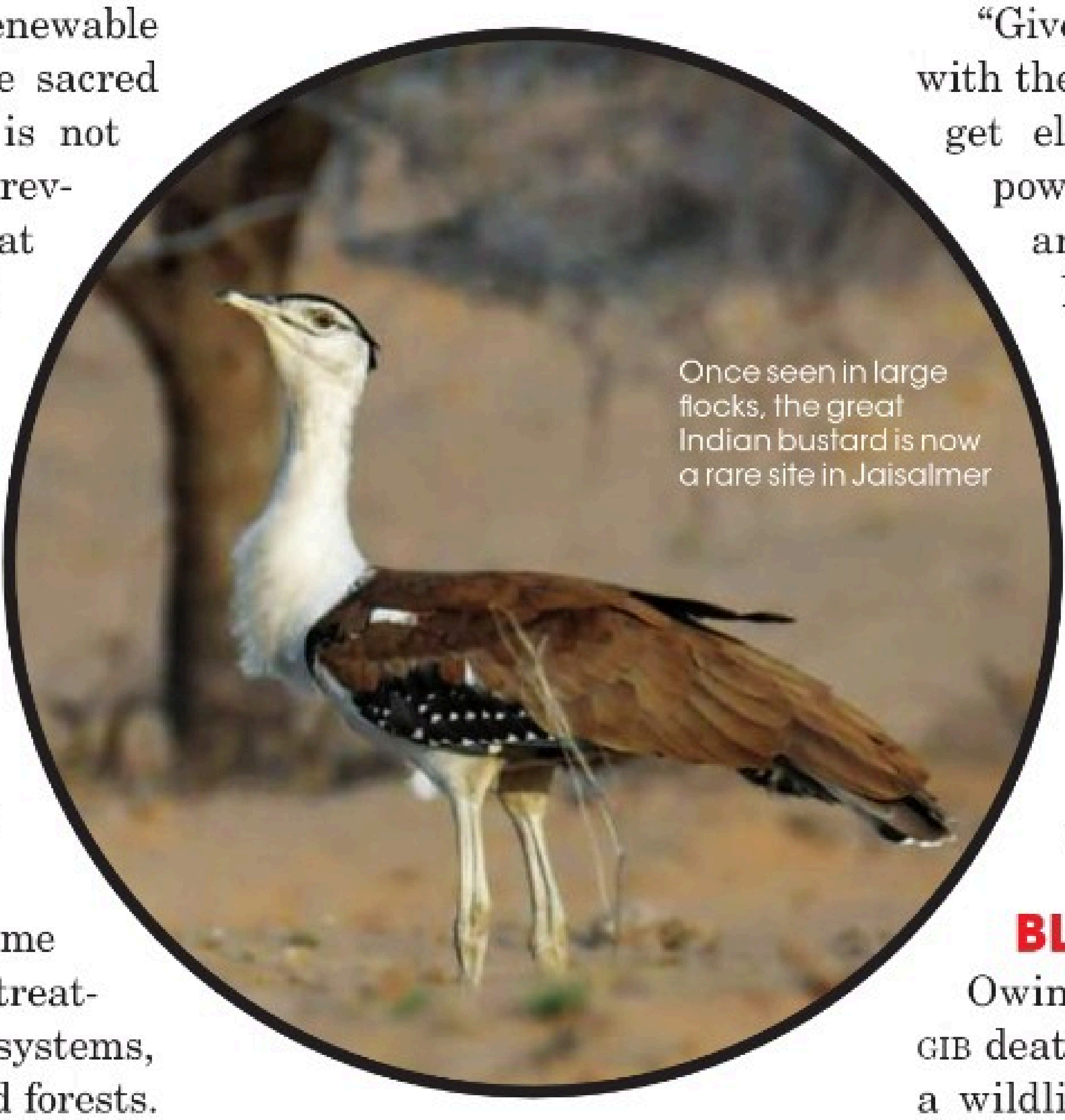
Windmills and solar plants have become a part of the Jaisalmer landscape threatening the natural habitat of the great Indian bustard along with other bird and animal species der the "critically endangered" category by the International Union for Conservation of Nature in 2011 (see 'Net loss', *p*46).

An open stretch of land with long hours of sunlight, high-speed winds and large plains, the area has become a hub of green energy. Windmills and solar plants are a part of the landscape. More solar plants and transmission towers are under construction.

Residents say the renewable plants are destroying the sacred grove because the land is not correctly identified in the revenue records. "We looked at land records only in 1999, when a power company started felling trees. We realised that the *oran* was registered as a farmland. After a long tussle with state authorities, we could only get 24,000 *bighas* (approximately 400 sq km) registered as *oran*," says Bhati.

In 2018, the Supreme Court ordered that *orans*, treated as open natural ecosystems, should be declared deemed forests. "So far there has been no development, and the state government is now welcoming power companies to the sacred groves, damaging GIB habitat," says Sumit Dookia, wildlife biologist working for the conservation of the Thar Desert. GIB is a large bird, about 1 m in height with a wing-span of 2 m, and an adult weighs up to 18 kg. As per the last count in 2018, there were only 150 GIBs in the country and 122 of them were in Jaisalmer. The remaining 28 were sighted in Gujarat, Maharashtra and Karnataka. "Since then, the population has declined further, and now less than 100 GIBs remain in the wild," says Dookia.

In June 2019, the forest department in Rajasthan, along with the Wildlife Institute of India, Dehradun, started a GIB breeding centre in the Desert National Park situated north of the *oran*, where they collect eggs from the wild and hatch them in captivity. The initiative has started to restore the population. "We have hatched 16 GIBs in captivity from eggs collected from the wild," says Sutirtha Dutta, scientist at the Wildlife Institute of India.



Once seen in large flocks, the great Indian bustard is now a rare site in Jaisalmer

PHOTOGRAPH: RADHESHYAM VISHNOI

"GIBs are slow breeders and lay only one egg every year, that too in the wild. The eggs are sometimes destroyed by cattle, or eaten by larger animals. My question is, if the entire habitat were lost, once the fledglings grow, where are the authorities going to release them?" asks Radheshyam Bishnoi of Godawan Community Conservation Project, a community-driven initiative in the region. "If we fail to protect the grasslands and the natural habitats of the bird, we will only be able to see it in captivity, like in zoos. Suppose the breeding centre is able to hatch 100 fledglings in the next five years, we will not be able to provide them with a suitable habitat because the whole area is covered in webs of high-tension transmission lines," says Dookia.

"Given their size, any collision with the power lines is fatal. They get electrocuted and die. The power lines have formed a web around the GIB habitat, leading to a sharp decline in their population in the last few years. We found a dead bird in September and many such accidents have occurred since these high-tension wires have been laid," says Parth Jagani, a conservationist in Jaisalmer.

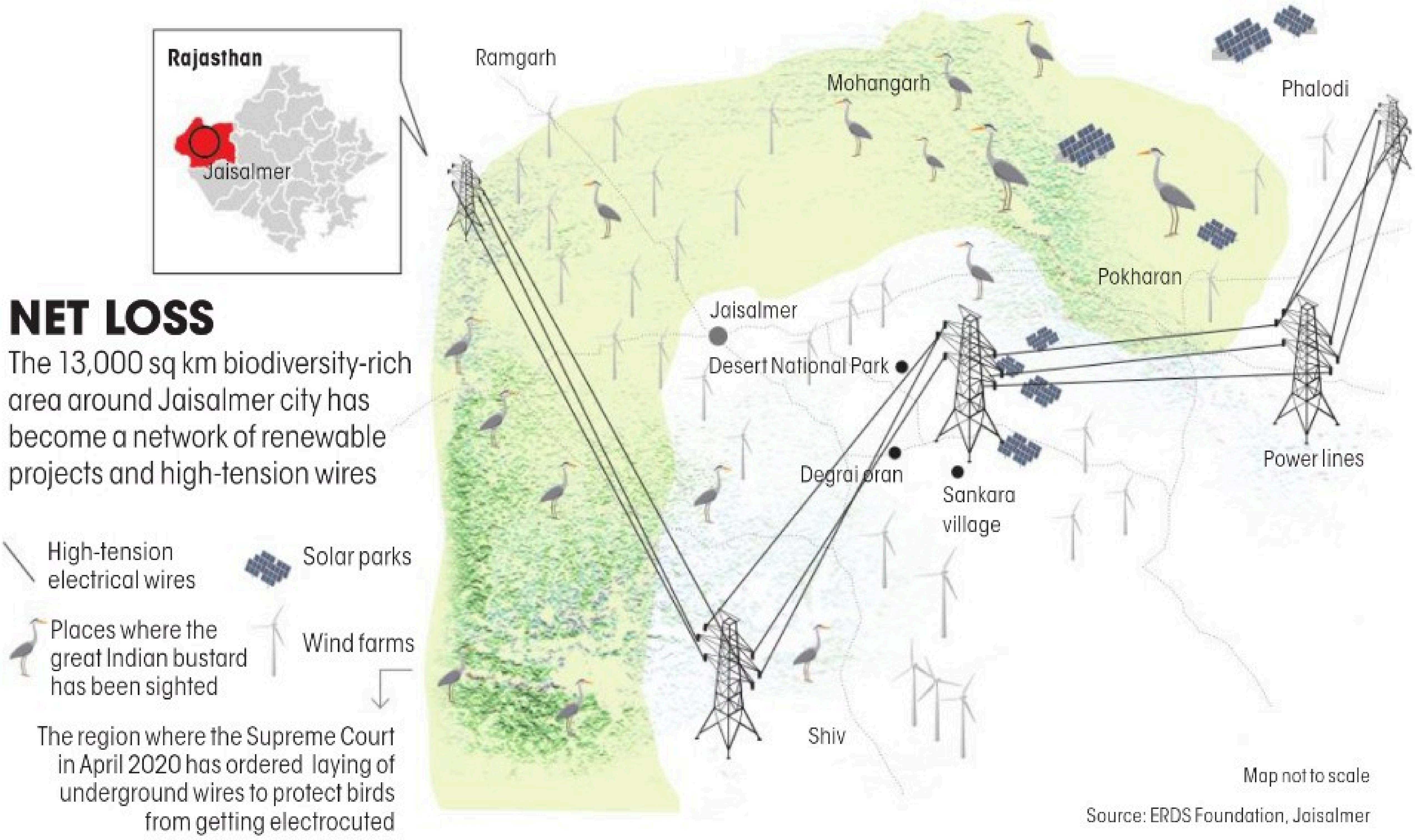
## BLATANT VIOLATIONS

Owing to the rising number of GIB deaths, M K Ranjitsinh Jhala, a wildlife conservationist, filed a petition in the Supreme Court in 2019 urging power companies to lay underground wiring in the GIB habitat in Jaisalmer. In April 2021, the apex court ordered power firms in Rajasthan to lay underground wiring for all projects and install diverters on existing lines in the region.

Jhala says underground wiring has been done in many states, including Delhi, as well as in other countries. "Even if the power companies use 2 per cent of their corporate social responsibility funds, they will be able to meet the added expenses," he adds.

## NET LOSS

The 13,000 sq km biodiversity-rich area around Jaisalmer city has become a network of renewable projects and high-tension wires


Rajasthan
Jaisalmer
Ramgarh
Mohangarh
Phalodi
Pokharan
Jaisalmer
Desert National Park
Degrai oran
Sankara village
Power lines
Shiv
High-tension electrical wires
Solar parks
Places where the great Indian bustard has been sighted
Wind farms
The region where the Supreme Court in April 2020 has ordered laying of underground wires to protect birds from getting electrocuted
Map not to scale

Source: ERDS Foundation, Jaisalmer

In October 2021, Jhala and other environmentalists filed another petition in the apex court, stating that its April orders were being flouted by the power companies who continued the construction of overhead power lines in the area. The verdict is awaited.

"It has been well observed that transmission lines and GIBs cannot coexist. Even other birds like raptors, floricans, demoiselle cranes and migratory birds get killed because of the power lines. Except for the Pokhran field firing range and the Desert Park, there are transmission lines everywhere. Even the *oran* has not been spared," says Bibhas Pandav, director, Bombay Natural History Society.

"The solar companies have taken up our *oran*, uprooting native trees and grasses that have not even been documented properly. We know that India is committed to achieving ambitious solar and wind energy capacity by this year. But what we are losing in the process is irreplaceable," says Sumer Singh Bhati, a conservationist from Sanwata. The birds cannot be expected to stay within a protected area. They fly out and so there is a need to make the adjoining areas secure for them, he adds.

### WEAK PUSH

In response to the April 2021 Supreme Court verdict, the Union Ministry of New and Renewable Energy (MNRE) has filed an interlocutory application where it has alleged underground transmission will make renewable projects untenable. It says the project costs will increase by four to 20 times and as a result, derail the country from realising its renewables goals. "So far, only a miniscule 3 per cent of the estimated potential of around 263 GW of renewable energy in this area has been tapped. If the remaining potential stays untapped, we will need an additional 93,000 MW of coal-fired capacity to replace the unutilised renewable energy in the future," reads the application.

Admiting that 65 GW of solar and wind energy projects lie in the GIB habitats in Rajasthan and Gujarat, it says no company globally manufactures underground cables for 765 KV that is ideally needed for transmitting electricity from the plants. Additionally, pushing the wiring underground may lead to disputes over "right of way" to lay the cables under privately owned land, risking land acquisition litigation and causing delays in the projects. There are also safety issues as faults may cause electrocutions in the area.

The Centre has set up a three-member committee, as directed by the apex court in its April 2021 verdict. The committee comprises of Dutta from the Wildlife Institute of India, Rahul Rawat, scientist at MNRE and Devesh Gadhvi of the Corbett Foundation and will look into the possibility and technical aspects of undergrounding the high-tension power lines.

*Down To Earth* sought responses from O2 Power Private Limited, ReNew Power, the National Solar Energy Federation of India and Rajasthan Renewable Energy Corporation Limited, the major players in the region, on emails as to why they were not adhering to the apex court's verict. But none of them responded. Madhur Kalra, head of communications at ReNew Power, refused to comment, saying the matter is sub-judice.

## THE COST OF GREEN

Challenging the notion "green is always good", conservationists insist on looking at solar and wind projects objectively. They say situations like the one in Jaisalmer need careful scrutiny and that renewables should not be supported blindly.

"Power companies are not doing this for environmental reasons. They are doing this for profit. In fact, in India, renewable energy companies are some of the most unregulated in the world," says Abi T Vanak, ecologist and senior fellow with Ashoka Trust for Research In Ecology and The Environment (ATREE). In the US and Europe, wind and solar companies are subject to environmental impact assessments just as any other development project. Large-scale studies are conducted on avian flyways before situating wind farms and power lines. "If we had kept the stringent provisions here, I suspect we would not be having this conversation," he says.

M D Madhusudan, conservation scientist with the National Centre for Biological Sciences, Bengaluru, says that unlike forests, there are no conservation laws that protect against diversion of biodiversity-rich open natural ecosystems, otherwise termed as wastelands, and governments try to make them "useful and productive" by allowing solar and wind parks on them. This is unfortunate as research has shown that under certain environmental conditions, open natural ecosystems can sequester more carbon than if trees were planted on them. "The value of such ecosystems is being undervalued and the benefits of renewable energy are being overstated. If we talk about solar energy, we need to see not only the gains, but also the pains," says Madhusudan. The inclination towards solar energy also involves the "political economy of power generation".

**IN THE US AND EUROPE, WIND AND SOLAR COMPANIES ARE SUBJECT TO ENVIRONMENTAL IMPACT ASSESSMENTS JUST LIKE ANY OTHER DEVELOPMENT PROJECT**

"In the case of the hydroelectricity, the public sector controls over 90 per cent of both installed capacity and power generation. But in the case of solar and wind power, around 95 per cent of it is in the hands of the private sector," he says.

## BETTER ALTERNATIVES

Conservationists agree that the country needs to invest in green energy. They insist it does not have to be at the cost of biodiversity. The advantage of solar energy is that it can be distributed and decentralised. The government simply needs to follow its own rooftop solar policy, and modify it to become a "grey-top" solar policy, which means setting rooftops on top of industries and factories that are spread over large spaces. Madhusudan and Vanak say that unlike rooftop solar on residences, large industrial spaces generate enough electricity to make economic sense to connect to the grid. Such localised generation and utilisation will also cut transmission losses. Rooftops of public buildings can also be used for solar installations, as has been done with railway stations in some cities.

They also suggest agrivoltaics, the practice of using farmland for generating solar power and agriculture simultaneously, as an option to increase the area under renewables. "Deploying solar panels in a manner that allows for cultivation below them has dual benefits. The shade from the panels reduces evapo-transpiration and saves water, and the panels themselves benefit from increased efficiency due to the cooling effect of the plants growing below them," says Vanak. The Alliance for Reversal of Ecosystem Service Threats, a project under ATREE, has identified 11 million hectares of degraded agricultural land in the semi-arid and sub-humid regions of India. If such areas were used for agrivoltaics, it could potentially transform rural economies of these regions. DTE

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# Viva Cuba for its vaccine revolution

## Punching way above its weight, the tiny nation has developed five vaccines, and offers hope of vaccine equity across the world

THIS IS possibly the quietest and most stunning of Cuba's revolutions since Fidel Castro overthrew Batista's military dictatorship in 1958. There have been other revolutions in the tiny nation over the decades—in public health, in medical internationalism (where doctors were sent to countries in need) and most impressively in its biotechnology sector. Even so, the development of five vaccines to fight the SARS-COV-2 virus that causes COVID-19, three of which have been deployed to vaccinate 93 per cent of its population, is an unparalleled feat.

This has been largely unnoticed by the global media, which was focused almost entirely on the newfangled and expensive MRNA vaccines brought out by the likes of Pfizer and upstart company Moderna, and was writing paeans about their bosses. Science journal *Nature* was one of the earliest to spot the breakthroughs made by Cuba's Centre for Genetic Engineering and Biotechnology and Finlay Institute of Vaccines. Towards the middle of 2021, a couple of news agencies began to report on the good news emanating from Havana, piquing interest as Cuba sent vaccines to some countries.

When the COVID-19 pandemic hit the Caribbean island, the Cuban spirit of independence, honed by six decades of trade sanctions imposed by the Americans, once again came to the fore. Depending on the rich world to send vaccines would in all likelihood mean a long and possibly futile wait—which it indeed has for a host of low-income countries in Latin America, Africa and Asia. Cuba's decision to fight the pandemic on its own holds many lessons for other countries, especially India, which has 10 times the scientific humanpower of Cuba apart from more resources and a much freer access to the inputs required for its research. The fundamental difference is the depth of Cuba's education and science as well as the clear alignment of its research and development (R&D) with the social and economic priorities of its people. This is how Cuba built an outstanding health biotechnology sector that is globally respected.

Havana's decision to channel its resources and formidable research talent into developing its own vaccines indicated a determination to brush aside its acute economic crisis. It also entailed the shelving of some important research projects, but the heavy caseload of COVID-19 cases called for urgent action. The results of the year-long effort have been spectacular. Cuba, with a population of 11.3 million, has developed five vaccines and says four of them provide over 90 per cent protection against COVID-19 when administered in three doses. This has allowed the country to vaccinate a massive percentage of its population, more than any other country barring the oil-rich United Arab Emirates—a Gulf state that has a lower population than Cuba—and Portugal, which is a fraction ahead. As of January 20, 2022, some 86.54 per cent of Cubans are fully vaccinated (three doses) and another 7 per cent have been partly inoculated, according to the dashboard of scientific website *Our World in Data*.

Glasgow University academic and Cuba expert Helen Yaffe describes this as an "incredible feat," while John Kirk of Dalhousie University in Nova Scotia, another Latin American specialist, was equally laudatory. "Just the sheer audacity of this tiny little country to produce its own vaccines and vaccinating (sic) over 90 per cent of its population is an extraordinary thing." Both were speaking to *CNBC*. But given Cuba's track record, this should not come as a great surprise. In the 1980s when Castro sensed the potential of biotechnology—at a time when even the most advanced rich nations had not yet grasped the possibilities of this nascent field—he invested an unbelievable US $1 billion in the sector. He also sent his scientists to the pioneering researchers in the US, Finland and Canada who were ready to share the fruits of their R&D without putting up intellectual property barriers, along with those in the former Soviet Union.

**Cuba's decision to fight the pandemic on its own holds many lessons for India, which has much more scientific humanpower, resources and access to inputs**

As a result, bio-pharma innovation has been a hallmark of the Cuban system since the 1980s, an endeavour dedicated to finding low-cost drugs to combat life-threatening diseases such as hepatitis, polio and meningitis B. But this is not what makes Cuba special; rather, it is its readiness to share its discoveries with other Third World countries that puts it in a class of its own. The World Health Organisation (WHO) lauds Cuba as "a global leader in South-South transfer of technology, helping low-income countries develop their own domestic biotech capabilities, providing technical training, and facilitating access to low-cost life-saving drugs to combat diseases such as meningitis B and hepatitis B."

As the world grapples with new variants of SARS-COV-2, Cuba's discovery that its three-dose regimen of the vaccines—the Abdala vaccine is protein-based while the others, collectively called the Soberana series, use a "conjugate" design along the lines of meningitis or typhoid vaccines—spells hope for countries that have been scrambling for doses. Political allies may probably get priority, since emergency shipments have already been sent to Venezuela, Nicaragua, Iran and Vietnam while waiting for WHO's approval of the vaccines. This would help make the vaccines more widely available.

In a significant tie-up, the Finlay Institute has joined with the Pasteur Institute in Tehran to run a massive 24,000-person clinical trial in Iran. The results are expected to be published shortly. The only problem for wider access to these vaccines is the limited production in Cuba. The Finlay Institute can produce 10 million doses of Soberana 02 per month, but the world needs more, especially in Africa, where vaccine inequity is stark.

Cuba-watchers like Yaffe believe its vaccines are their best hope for facilitating inoculation in the coming years. Health experts are talking less and less about the Covaxin jab produced by India's Bharat Biotech International Limited. Not only is its efficacy in taking on the new variants of SARS-COV-2 yet to be proven, its production has also not increased significantly. Nor have there been any licensing agreements with other companies, possibly because the ownership of the technology remains murky (see 'The curious case of Covaxin royalties', *Down To Earth*, 16-30 May 2021) or because it is not viewed as a viable project. So it is Viva Cuba, with the hope that its latest revolution spreads far and wide. DTE

@ljishnu

# Palette

## WHAT'S INSIDE

A silent journey of Santhali Sohrai murals into the concrete world **P52**

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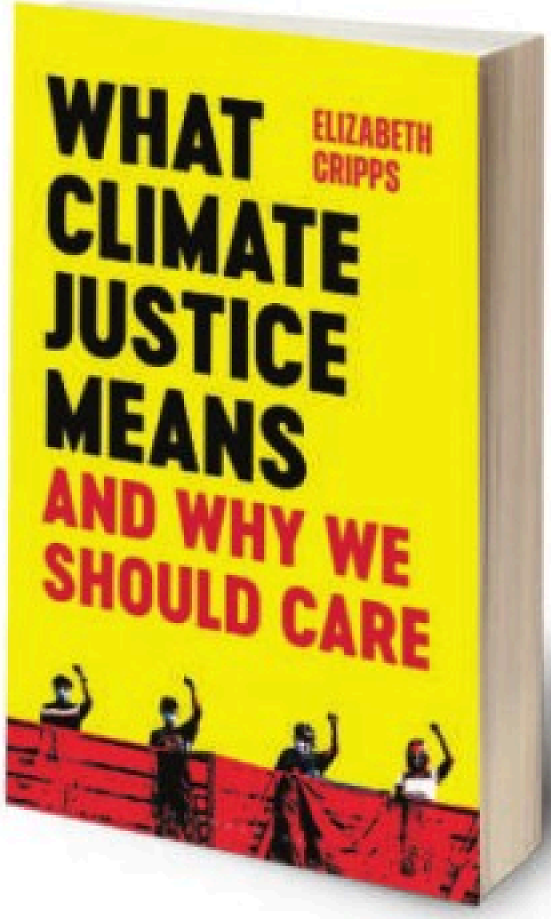
## RECOMMENDATIONS

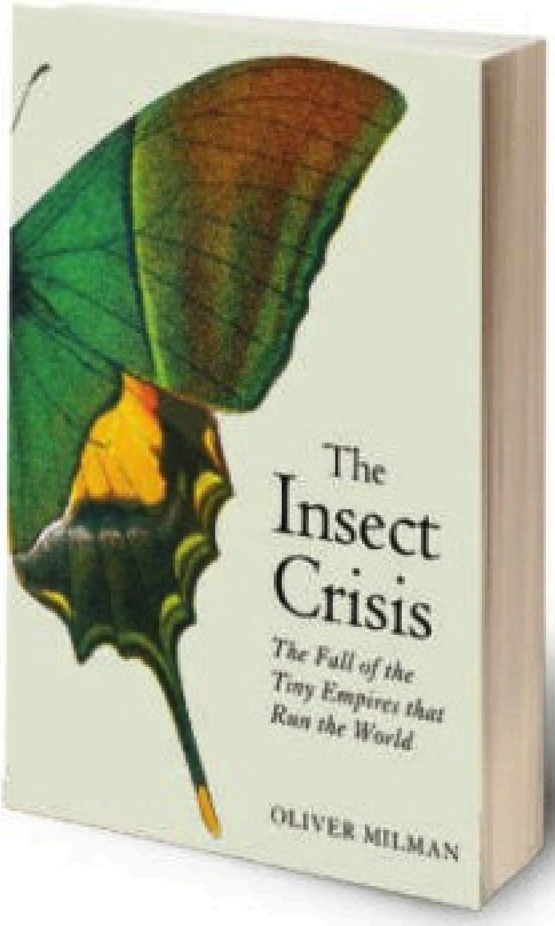
### DOCUMENTARY

Since 1974, award-winning documentary series *NOVA* has been revealing, clarifying and sometimes even discovering the wonders of science. The long-running series is back for its 49th season, starting with the latest topic creating scientific buzz—melting of the Arctic region. Scientists will investigate colossal explosions in Siberia and other regions of the Arctic, with the rapidly melting soil releasing copious amounts of methane, a potent greenhouse gas. The episode, *Arctic sinkholes*, will kick off the latest season of *NOVA* on *Public Broadcasting Service* on February 2.

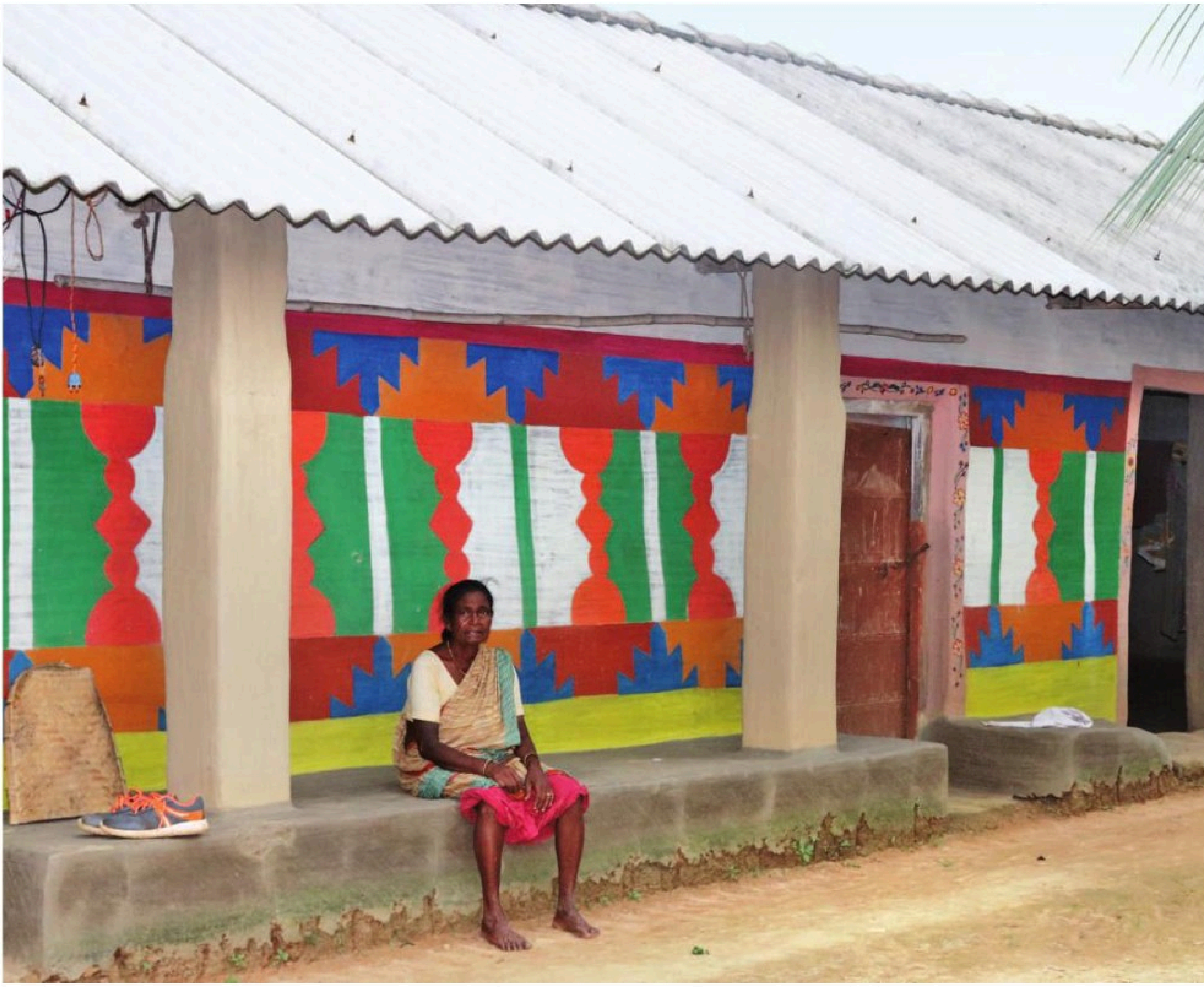
### BOOKS



The concept of climate justice is not just an abstract idea for theoretical discussions, but one that should be as deeply entrenched and pursued in the global system as are the concepts of colonial and racial justice. This is what British philosopher and author Elizabeth Cripps lays out in *What Climate Justice Means And Why We Should Care*. She also lays out how countries and organisations can go about this pursuit, measure accountability and ensure a world better protected from climate change.



In the grand scheme of things, insects often look like tiny and insignificant creatures. However, they are an integral part in determining the survival of life and their collapse spells irreversible doom for global ecosystems. From Mexico's monarch butterflies to the UK's pollinating bees, insect worlds globally are dwindling in the face of urbanisation and environmental degradation. British journalist Oliver Milman shines a light on this catastrophe in *The Insect Crisis: The Fall of the Tiny Empires That Run the World*.



Santhali Sohrai murals vary across regions, prominently featuring geometric shapes (shown above). The prominence given to geometry in the murals can be linked with the Santhal community's affinity for symmetrical precision in its architecture

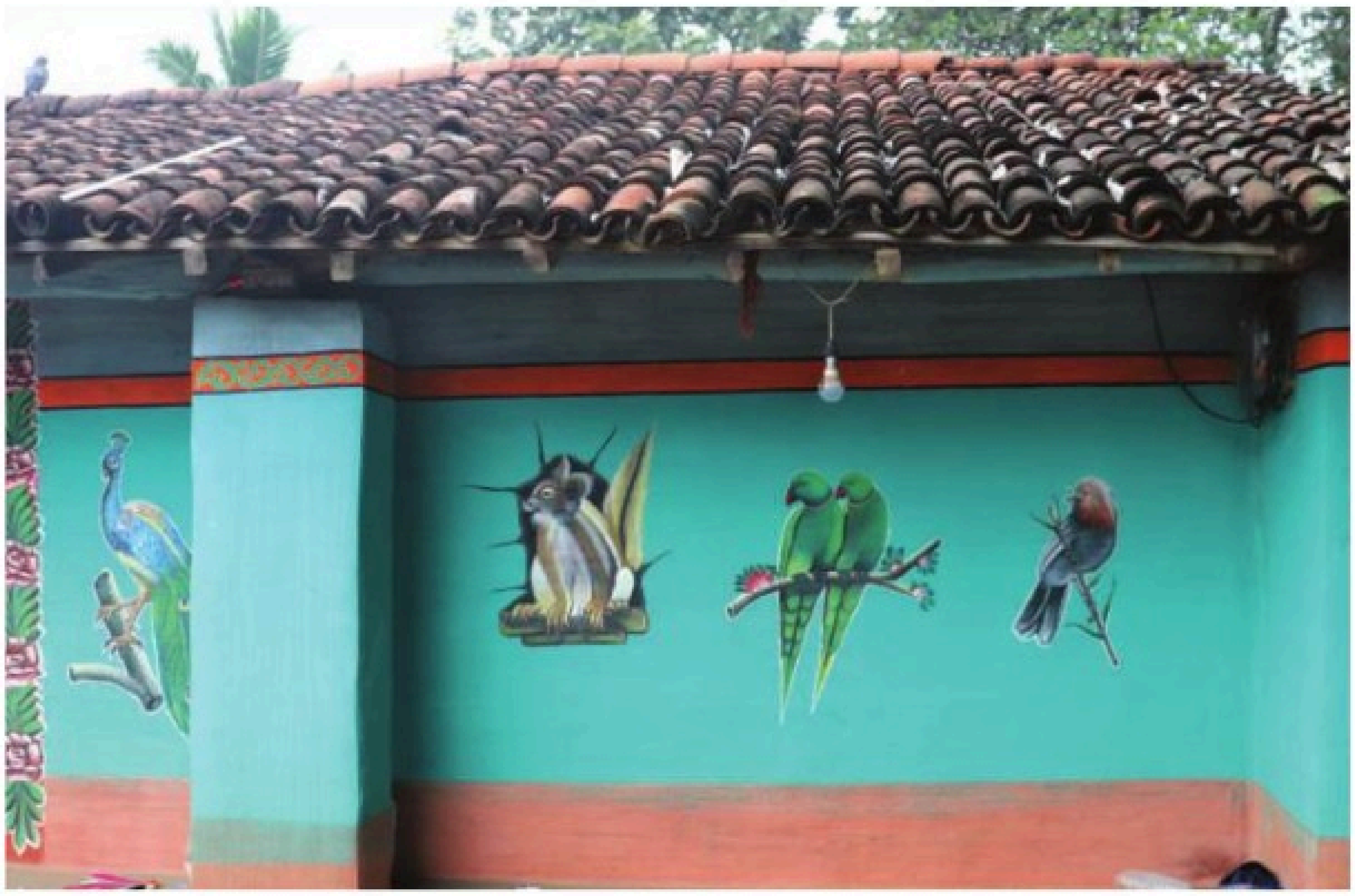
# AN ETCH IN TIME

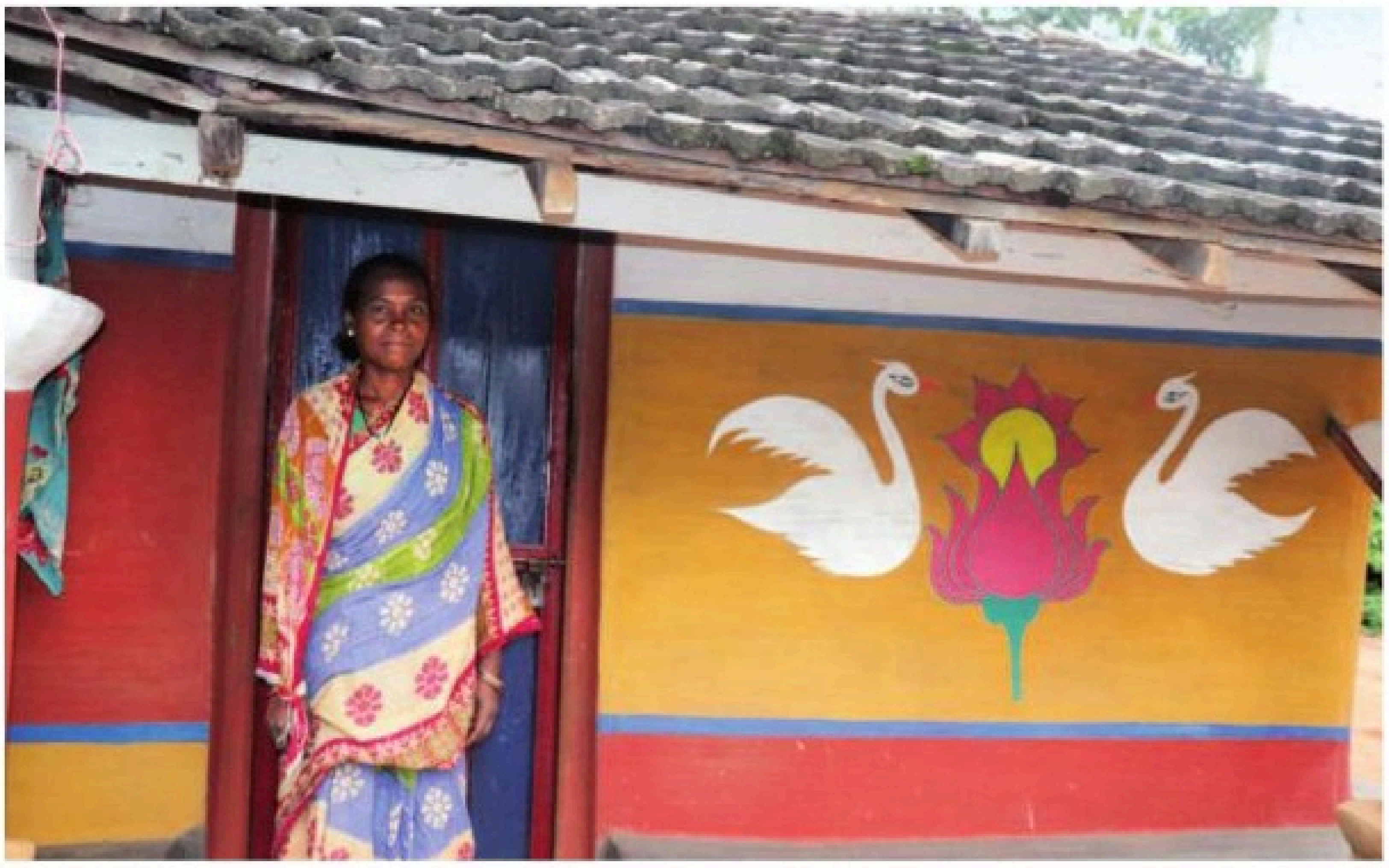
## Santhali communities of Odisha and Jharkhand are changing their ways of painting Sohrai murals

**DEEPANWITA GITA NIYOGI**

KEONJHAR AND MAYURBHANJ, ODISHA

PHOTOGRAPHS: DEEPANWITA GITA NIYOGI





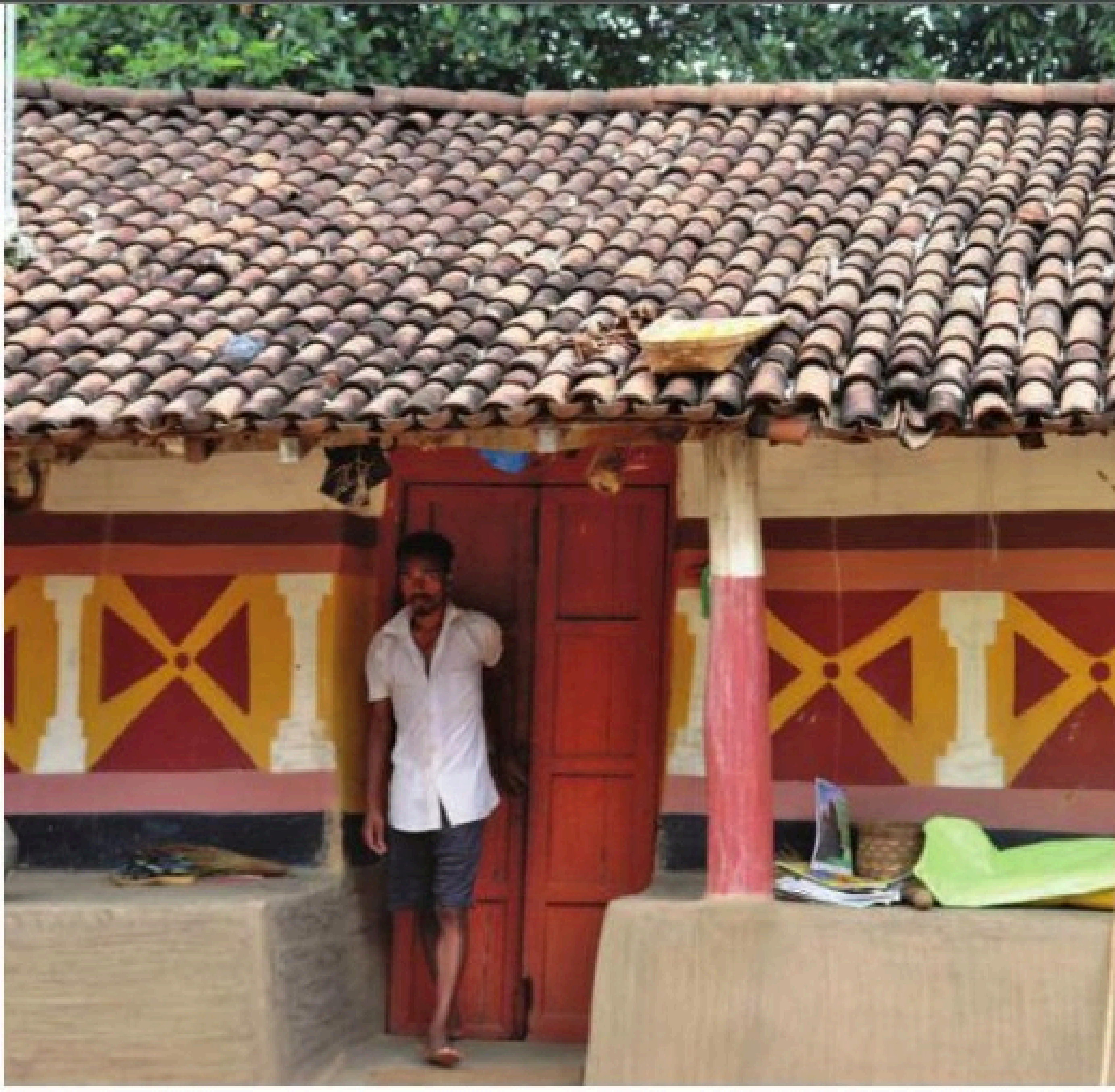
ON A journey across Keonjhar district of Odisha, one house in Hariharpur village literally beckons. Structurally, the mud house with tiled roofs is no different from most other dwellings across tribal villages in Odisha and neighbouring Jharkhand. But vibrant, attractive murals on the walls set the house apart. One that piques interest depicts two white swans on either side of a flower with pink petals, yellow at the centre and a thick green stem.

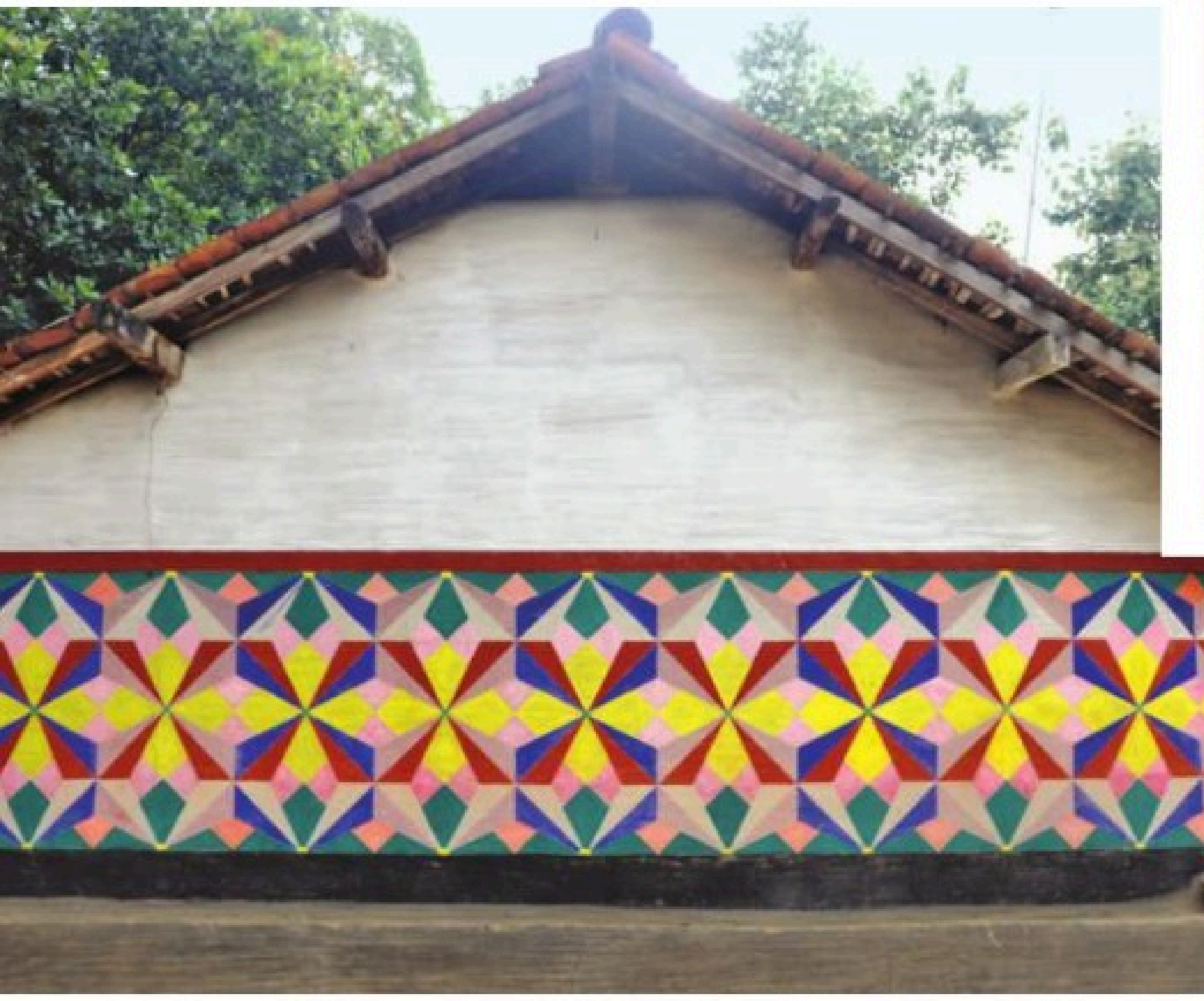
Such murals are part of a long tradition of the Santhal community that dominates Keonjhar and Mayurbhanj districts of Odisha; East Singhbhum and Seraikela-Kharsawan districts of Jharkhand; and Purulia district of West Bengal. Santhali women usually paint the walls of their houses to mark Sohrai, a harvest festival coinciding with Diwali or Kali Puja. "Women in our village often compete with each other to make the prettiest murals during Sohrai," says Sumati Marandi, who has made the swan mural. The art also adorns walls during ceremonies or special occasions, such as weddings and childbirth.

Social worker Jaypal Singh Sardar, a resident of Chandpur village in Potka block of East Singhbum, says murals are found in almost every village in the district. Apart from the Santhals, the Bhumij community in the district also paints them.

In 2020, Jharkhand received a Geographical Indication tag for its Sohrai art particularly for the murals painted by women in Hazaribagh district who do not belong to the Santhal tribe. However, these are quite different from the murals created by the Santhal tribe, says Justin Imam from Hazaribagh, who works on conservation of Sohrai art. The murals of Hazaribagh are more primordial with different motifs, whereas the Santhali Sohrai art features only geometric shapes. Imam attributes this to the community's affinity for precision. "Their architecture is meticulous. Every Santhali has a raised platform outside their house that is symmetrical and involves geometry," Imam says.

Besides, the women of Hazaribagh only use earth colours—red, black and white—for their murals. The north Karanpura valley of the district





Traditional colours used in Santhali Sohrai paintings use black, red and white (above), derived from natural sources such as gravel and clay. However, modern Santhali women now prefer to use artificial colours like blue, pink, green and orange (left). They also create new shades by mixing two or more colours

and its Satpahar and Sati hill ranges are rich in coal, iron and manganese deposits. Rivers flowing through these hills thus carry managanese-rich black clay, which is used for the art. The creamy white clay or Kaolin is obtained from places where the rivers spread out, while the red colour is sourced from haematite or iron ore deposits in the rock shelter or prehistoric caves of the valley. Women soak these deposits and wash them to obtain the desired paint. Santhali women use similar clay materials for black and white colour. But for red, they use gravel or *morrum* derived from cutting earth, instead of haematite. "*Morrum* is thought to be termite resistant and does not fade easily with rain," says Imam.

## ART IN TRANSITION

These days, Santhali women use several other colours for their murals. "Young girls prefer using synthetic shades that are easily available in the market and cost ₹40-50 a bottle," says Pinky, Jaypal Singh Sardar's wife. Murals nowadays show off brighter (neon) shades of lime yellow, orange, pink and violet to blue, bottle green and reddish maroon. Some also create colours by mixing two or more shades.

Back in Hariharpur village, one can see even attractively coloured doors that complement wall murals. Marandi's door is elaborately painted blue, red and green.

One wall usually takes one or two days, depending on the intricacy of the murals, she says. Before painting, she sometimes makes rough patterns with a pencil and scale. If satisfied, she then fills in the colour by wrapping a small cloth on a stick or twig. But indulging in this artwork is a luxury. "With a family to look after and household work, I find it difficult to devote much time," Marandi says.

**SANTHALI SOHRAI MURALS PAINTED ON CEMENT WALLS ARE MORE SUSTAINABLE THAN ON MUD. BUT THEY LACK THE NATURAL CHARM**

Concrete houses replacing the mud and tiled ones also have an impact on the traditional Sohrai art. In Erandi village of Keonjhar, Shyamsundar Baskey's love for murals did not end even after he shifted to a concrete house, where he has covered the interior walls with floral murals. "While drawing on mud walls, we needed large quantities of colour. The murals also used to get washed away during the heavy monsoon that the forested parts of Keonjhar receive. Compared to that, murals on cement are long-lasting," Baskey says. He, however, admits that the murals on concrete interiors lack the natural charm of mud walls. DTE

@down2earthindia

Mango ginger tastes best when consumed fresh or in chutneys and pickles

PHOTOGRAPH: VIBHA VARSHNEY / CSE

# UNUSUAL SUSPECT

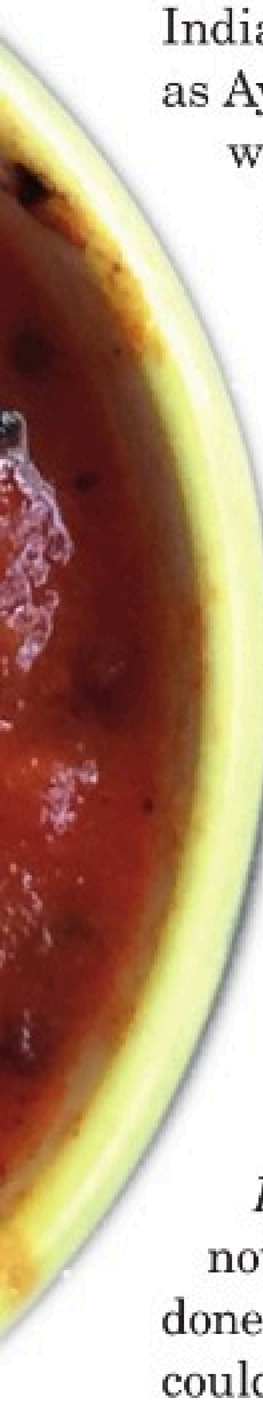
## MANGO GINGER CAN PEP UP EVEN SIMPLE MEALS, ENSURE WELL-BEING

**VIBHA VARSHNEY**

MANGO GINGER can be regarded as the master impersonator in the plant kingdom. This spice, known as *Curcuma amada* in scientific lexicon, resembles ginger because of its irregularly branched rhizomes and white flesh, and has the rich sweet flavour of a raw mango. However, it is nowhere close to a mango or ginger. Rather, the spice belongs to the same genus as turmeric (*Curcuma longa*). But even here there is a difference: unlike turmeric's rich yellow tissue, mango ginger just has a pale yellow core.

Two *Curcuma* species share the name mango ginger. While *C mangga* is native to Indonesia, *C amada* is said to have originated in India. Almost all the major languages of India have a name for the spice, which suggests its long history of use in the country. Its Bengali name *ama ada,* which literally means mango-like flavour, may have provided its scientific name. Some names allude to its direct link with turmeric, like *amragandhi haridra* (in Sanskrit), *aam haldi* (Hindi), *ambe halad* (Marathi), *amba haldar* (Gujarati) and *huliarasina* (Kannada). Other southern languages refer to it "mango ginger" or *manga inchi* (Malayalam), *mankayinchi* (Tamil) and *mamidi allam* (in Telugu).

The spice is cultivated in parts of Odisha, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh, where it is usually planted in April and harvested seven to eight months later. But because of its scattered cultivation pattern, data on area, production and productivity are not available. Its flowers are white or pale yellow and valued as decoratives. Good cut flowers have a vase life of 10 days.



Much like turmeric, the rhizome of mango ginger is used extensively in traditional medicine. It has some 130 compounds with antioxidant, antibacterial, antifungal and insecticidal properties, says a 2007 review article published in *Phytotherapy Research* by researchers in Japan. Indian systems of medicine such as Ayurveda and Unani use the wound-healing properties of the crushed rhizome to treat internal injuries and sprains. A 2015 study on mice by researchers from VNS Group of Institutions in Bhopal, published in *Current Traditional Medicine*, also finds that applying an ethanolic extract of mango ginger to wounds results in faster healing.

While turmeric is known to have some success in cancer treatment (see 'Hero herb', *Down To Earth*, 16-31 October, 2021), not much research has been done to show if mango ginger could have similar effects. However, researchers from Tamil Nadu have found its methanol extract can kill breast cancer cells without any adverse effects on non-cancerous cells. Their results were published in *Asian Pacific Journal of Tropical Medicine* in September 2014. A study in March 2021 by Andhra Pradesh researchers says mango ginger can be used to reduce obesity caused by high-fat and high-sugar diets. Rats, fed on 300 mg of the spice per kg of body weight, showed reduction in diet-induced obesity, memory loss, oxidative stress and neurodegeneration, says the study published in *Nutritional Neuroscience*.

## RECIPE

### TOMATO CHUTNEY

**INGREDIENTS**

*Panch phoron* (fenugreek, nigella, cumin, mustard and fennel seeds in equal parts): 1 teaspoon
Green chillies (slit): 1-2
Tomatoes (medium sized, ripe, chopped): 5
Jaggery: 3 - 4 tablespoons
Mango ginger (julienned): 1 piece, 1.5 inches in size
Mustard oil: 2 teaspoons
Salt to taste

**METHOD**

Heat oil in a pan and add *panch phoron*. Wait until they pop, and add the chilli and chopped tomatoes. Now add the mango ginger and let it cook till the tomatoes soften. Add jaggery, salt and half a cup of water to it; keep cooking till the tomatoes turn pulpy. Taste and adjust for salt or jaggery. Transfer to a serving bowl and garnish with a coriander leaf.

### INSTANT PICKLE

**INGREDIENTS**

Mango ginger: 50 g
Mustard seeds: 1 teaspoon
Asafoetida: 1/4 teaspoon
Vegetable oil: for temper
Lemon juice: 1 tablespoon
Salt to taste

**METHOD**

Cut the mango ginger into small pieces. Add salt and mix well. Add oil heated and tempered with mustard seeds and asafoetida. Add lemon juice and the pickle is ready to eat.

## USE AS YOU WISH

Along with medicine, mango ginger also finds extensive use in traditional cuisine. The rhizome is known to stimulate appetite.

People in Odisha, for example, use mango ginger as a palate cleanser between meal courses by simply cutting it into small pieces and mixing with salt and lemon juice, says Gurugram-based food blogger Shweta Mohapatra, who writes about Odia food. Crushed mango ginger is also added, along with curd, chillies and salt, to *pakhala bhat*, a fermented rice dish prepared by soaking cooked rice overnight. One of her favourites is a sweet and sour tomato chutney (see recipe).

Chitra Balasubramaniam, a Delhi-based food writer, prepares an instant pickle with the spice. She says that despite its benefits, unique taste and easy availability, mango ginger remains underutilised and has not been used much beyond traditional cuisine. She adds that people can easily experiment with this rhizome, as it can be added raw to several dishes.

The spice is said to taste best when consumed fresh or as pickles and chutneys. Though mango ginger is easily available in the forms of pickles and dried powder on e-commerce sites, its potential for greater use in the food industry is now being explored. Researchers with the Council of Scientific and Industrial Research-Central Food Technological Research Institute in Mysuru have mixed the rhizome powder with wheat flour in the ratio of 1:10 to prepare soup sticks. They say the spice improves both the texture and nutritional properties of the soup sticks. These had higher dietary fibre content (8.64 per cent) and antioxidant activity (48.06 per cent) as against control sticks (3.31 per cent and 26.83 per cent, respectively), they write in the *Journal of Food Science and Technology* in December 2014.

Used in any form, the quaintly named mango ginger is sure to add zing to a meal.

@vibhavarshney

**CIVIL LINES** / RICHARD MAHAPATRA

# Why we deny starvation deaths

HUNGER KILLS. This is the deduction from the recent Supreme Court outburst on starvation deaths in the country. "Can we afford to say that there are no starvation deaths?" asked justices A S Bopanna and Hima Kohli while hearing a public interest petition that seeks a national policy for community kitchens, and reacting to the Government of India's claim that there had been no starvation deaths in recent times. The justices, part of the bench of Chief Justice N V Ramana, asked the government to submit any data on starvation deaths.

It's strange that India does not shy away from admitting high incidences of poverty and hunger, but its reaction to starvation deaths has always been denial. In the 1970s and 1980s, when starvation deaths were widespread, areas reporting such incidences used to receive attention from the highest political leadership and were visited by prime ministers. But in recent times, such a report is followed by listing out of welfare measures to fight hunger and attempts to bury the allegation with technical arguments over how to certify starvation death. In the current case, going on since 2019, a petitioner had once asked why an autopsy is necessary to ascertain starvation as the cause of death.

The debate has been raised many times since the mid-1990s when the Kalahandi-Balangir-Koraput (KBK) region of Odisha reported hundreds of starvation deaths. In 2011, a large number of such reports from the region forced the National Human Rights Commission (NHRC) to hold its first full bench outside Delhi—in Odisha. Its verdict on the state government's denial of starvation deaths of 12 children, can shed some light on the ongoing debate. NHRC said starvation might not be the "immediate reason" for the deaths of the children, but the "pattern did suggest to the prevalence of a larger rot in the nutritional security of the district". Earlier also, reacting to starvation deaths in KBK region, it had said: deprivation, hunger and poverty all conspire one to reach to a level of starvation that ultimately kills. NHRC had thus recommended measures such as free kitchens, soil and moisture conservation programme, employment assurance schemes and also elaborate health infrastructure.

Poverty, hunger and malnutrition are inter-related; often, one leads to another. In December last year, the NITI Aayog released an index, which used health, education and standard of living as indicators to gauge the poverty level and its intensity. It says 25.01 per cent of India's population suffer from multidimensional poverty. Under the health indicator, nutrition, child mortality and maternal health were used as sub-indicators, as they have an umbilical relationship with hunger and poverty. The National Sample Survey Organisation's 66th survey in 2013 also highlighted the prevalence of hunger in India. For instance, it said, almost 1 per cent of the rural population did not get two square meals a day some months of the year; the figure is more than twice for farm labourers. Given this level of poverty and hunger, why do we not accept the reality of people dying of starvation?

**Starvation deaths reflect the failure of government to protect the fundamental right—the right to life**

This is because starvation deaths reflect the failure of the government to protect the most fundamental right—the right to life. They reflect the failure of expansive welfare measures, ostensibly taken up to eradicate poverty, hunger and malnutrition. India has faced millions of starvation deaths in the past due to drought and famine. Those were always attributed to the colonial rulers. It is said that famines vanished with the descent of democracy. So, even a few starvation deaths have that power to paint an elected government in colonial hues.

@richiemaha